

EVOLUTION OF PRE-MAIN-SEQUENCE BINARY STAR SYSTEMS

By

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This paper develops a quasistatic polytropic model. It represents the pre-main-sequence contraction phase. The model was applied to both components of close binary star systems. The initial conditions for the models were determined from the Roche Lobe. The period and masses for the systems determine the maximum stable radii for both stars. Both stars were allowed to contract from the initial models. In the early stages, it may be necessary for a secondary to evolve along the Hayshi Track. The time for each contraction had to be calculated by an iterative procedure. The time steps were corrected for nuclear energy sources between iterations when needed.

Models were calculated for eleven observed semi-detached close binaries published in the literature. The

combined mass of each system's components is between 2.5 and 6 solar masses. First, the results of the model were compared with the observed systems, then a determination was made concerning their pre-main-sequence nature and age. The names and ages of the three that are likely to be pre-main-sequence are: U Cephei (6.1×10^5 years), X Trianguli (4.6×10^6 years), and W Ursae Minoris (1.87×10^6 years). The following four systems were found not to fit the pre-main-sequence model in this investigation: TV Cassiopeia, AI Draconis, β Persei and TX Ursae Majoris. Finally, the next four systems could be pre-main-sequence with modifications to the model: IM Aurigae (3.5×10^5 years), δ Librae (8.2×10^5 years), U Sagittae (3.78×10^5 years), and V505 Sagittarii (1.89×10^6 years).

CHAPTER I

INTRODUCTION

The problem of the formation of a close binary star system has not been solved. No detailed understanding exists for the physical process involved. The processes for the formation of a single protostar are still incomplete. At least three factors make the formation of a selfgravitating protostar very difficult: conservation of angular momentum, magnetic fields, and interstellar gas dispersion.

Conventional studies of binary evolution usually do not consider any mechanism of formation. Usually model calculations, e. g. Paczynski (1971), are started with both stars on the main sequence. The star that is originally the more massive is called the primary. In most cases only the evolution of this component is followed in detail. Mullen (1974), however, followed the detailed evolution of both stars in the case of a W Ursae Majoris type binary model. Nevertheless initial conditions were that both stars were on the main sequence.

The evolution of binary stars from the main sequence is identical to that of single stars until the more massive star expands to fill its Roche Lobe. At this point,

Crawford (1955) proposed that a large fraction of the mass is transferred to the secondary. The roles of the primary and secondary may actually reverse. Sahada (1962) asked whether such a star, originally a certain spectral type, after acquiring mass from the other star could become a more massive object that nevertheless would show a "normal" spectrum of an earlier type.

The mass transfer, during the reversal, goes through a rapid thermal phase. Then the star has a tendency to expand slowly on a nuclear time scale because of hydrogen burning in the core. The nuclear transfer phase is the most likely to be observed.

Assuming that a binary can be formed, Thomas (1977) has stated that the prototype of close binary evolution with mass transfer has confronted theoreticians with an increasing number of problems. He considers the post-main-sequence evolution to be understood in principle. The problems arise as soon as we investigate individual systems.

Recently, three investigations indicate the need to study individual systems of the pre-main-sequence type. Some observed systems are shown to be pre-main-sequence (Field; 1969), some observed systems violate the requirement that a zero-age contact system cannot exist (Leung and Wilson; 1976), and some show mass transfer rates that are on a thermal time scale (Hall and Neff; 1976). These cases are reviewed below.

Field (1969) found that some close binary systems appeared to be pre-main-sequence. Field used data for the contraction of single pre-main-sequence stars published by Iben (1965) to find the age of the stars. Both components of the binary were assumed to be formed simultaneously as single stars on their respective Hayashi Tracks (see Chapter II). Four systems were determined to be pre-main-sequence. They are KO Aquilae, TV Cassiopeia, WW Cygni, and Z Herculis. Their total orbital angular momentum are similar to that predicted by Roxburgh (1967) for stellar fission.

Leung and Wilson (1976) have presented evidence that zero-age contact binary systems exist. Results of their photometric investigation show both components of V701 Scorpii and those of V1010 Ophiuchi are in contact. Their locations on the Hertzsprung-Russell diagram and their radii both suggest that the systems are zero-age. However, this result presents a problem. This is in contradiction to the post-main-sequence model for the origin of contact systems presented by Lucy (1968). This model requires the components of a zero-age contact system with a common envelope should have equal masses. However, many detached binaries with a mass ratio of unity are not observed. Contact binaries have been observed to be on the zero-age main-sequence, but none have a mass ratio of unity. In connection with this, Whelan (1970) showed the possibility that a mass ratio of unity was unstable for pre-main-sequence binaries. An alternative possibility is that the adiabatic

constants of the stellar envelopes are not equal. The later possibility implies short lifetimes for the individual systems. Bierman and Thomas (1972) allowed for different adiabatic constants by requiring a luminosity exchange to maintain contact of the system. Their model did not solve the problem of the light curves for W Ursae Majoris systems, nor did it propose a mechanism for the required amount of luminosity transfer. Therefore, their origin remains a theoretical problem.

Hall and Neff (1976) evaluated the period changes of 24 observed semidetached binary systems. Their model assumes mass transfer from the cooler to the primary component. The mass loss results in a period change because of conservation of angular momentum. Using the observed period changes they calculated the mass transfer rate for each of the 24 systems. All systems showed mass transfer on a thermal time scale. This time scale differs from that of the conventional post-main-sequence models for the formation of a contact or a semidetached binary system. For instance, Mullen (1974) found that each component of a post-main-sequence binary expands away from the main-sequence on a nuclear time scale. Thus, the problem of the pre- or post-main-sequence nature of a binary has not been solved. Each system must be evaluated on an individual basis.

The problem that the writer wishes to investigate is the evaluation of individual systems with a pre-main-sequence model. The main purpose of this investigation is to find

possible pre-main-sequence binary systems. This will be accomplished by comparing the positions of the observed binary on the Hertzsprung-Russell diagram with the evolutionary tracks generated by the pre-main-sequence model. If both components appear to have the same age and fall near the tracks of the model, then the system is likely to be pre-main-sequence. The investigation will include the evaluation of eleven binaries each with a total mass between 2.5 and 6 solar masses. In all cases the secondary star is over-luminous. These systems are classified as semidetached.

The model being considered is independent of the origin of a binary star system. The origin may be either condensation of both components as described by Wood (1962) or fission of a rapidly rotating pre-main-sequence core as described by Whelan (1970). Yamasaki (1971) studied the case immediately after fission where mass transfer may occur. As the stars contract, they must eventually detach themselves from their Roche Lobes. Yamasaki ends his investigation when mass transfer stops or a single star is formed because of excessive mass loss. The writer assumes the first case as the initial configuration of the pre-main-sequence model. At this stage the individual stars fill their Roche Lobes. Each star is allowed to contract gravitationally and independently toward the main-sequence.

As a comment on the study of origins, I would like to quote Whitcomb and Morris (1961) page 213.

. . . After all, any real knowledge of origins or of earth history antecendent to human historical records can only be obtained through divine revelation. Since historical geology [or stellar origin], unlike other sciences, cannot deal with currently observable and reproducible events, it is manifestly impossible ever really to prove, by the scientific methods, any hypothesis relating to prehuman history.

This idea applies directly to the problem of binary star evolution and origin. Experiments cannot be set up and conducted that will prove or disprove any case of binary origin. Only models of specific sets of conditions can be made and compared with observed binary stems. The "best" model which can be found has the fewest number of ad-hoc assumptions and predicts the greatest number of observed phenomena.

CHAPTER II

PRE-MAIN-SEQUENCE BINARY MODEL

The masses and periods for eleven observed close binary systems were selected from data tabulated by Giannone and Giannuzzi (1974). The stellar structure is represented by a polytrope of index $n=3$ for the radiative solution. A polytrope of index $n=1.5$ is used for the Hayashi solution. The Hayashi solution is represented by the line A-B on the Hertzsprung-Russell diagram shown in Figure 1. The radiative solution is line B-C. Both solutions are calculated for each model. The Hayashi solution is selected as long as it is above the radiative solution. After the solution is determined, the time step is calculated by an iterative procedure described in a later section. The model calculations are stopped when the primary reached the main-sequence.

The variables and symbols used throughout this chapter are listed below:

τ	Kelvin-Holmholtz contraction time (years)
Δt	Time step between models
ΔR	Radial contraction between models
R	Stellar radius
M	Stellar mass
r	Radial distance from Stellar Center
ρ	Density
P	Pressure
T	Temperature
a	Radiation constant

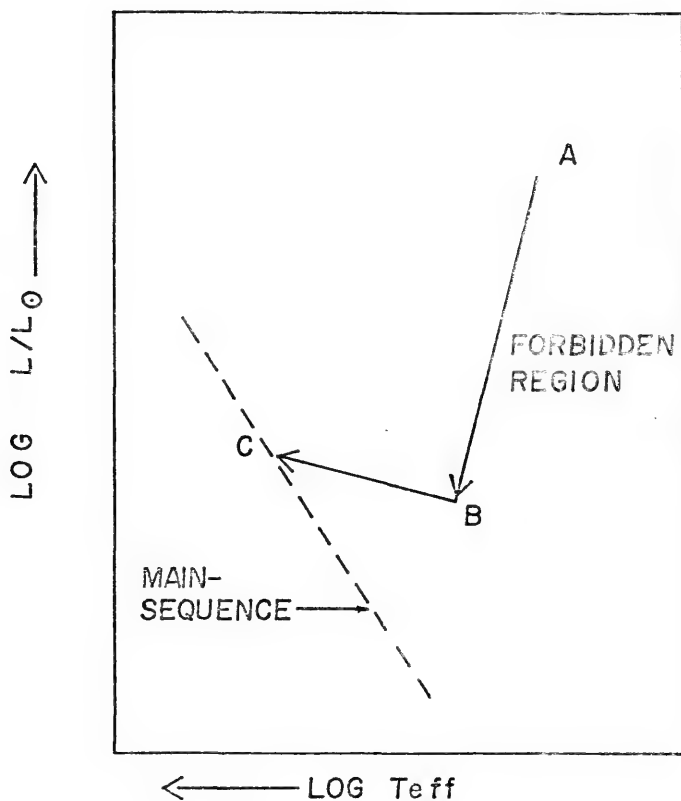


FIGURE 1. Schematic diagram of the evolutionary tracks on the Hertzsprung-Russell diagram for a given mass. Hayashi solution line A - B, the radiative solution line B - C.

c	Velocity of light
T_{eff}	Effective temperature
γ	Ratio of specific heats
n	Polytropic index
ξ	Polytropic radius
ξ_1	Polytropic radius at surface of star
K	Constant in polytropic relationship
κ	Opacity
σ	Stefan-Boltzman Constant
H	Mass of hydrogen atom
L	Total Stellar Luminosity
L_n	Luminosity due to nuclear sources
L_g	Luminosity due to gravitational contraction
L_h	Luminosity due to the Hayashi Track
A	Separation between the centers of the binary components
G	Gravitational Constant
ϵ	Total energy generation rate
ϵ_n	Energy generation rate for nuclear sources
ϵ_g	Energy generation rate for gravitational contraction
R	Gas constant

A. Kelvin-Helmholtz Time Scale

The Kelvin-Helmholtz contraction is known as the total pre-main-sequence phase of stellar evolution. The source of energy is derived totally from the gravitational potential. The time for this phase can be estimated by the following relationship:

$$\tau = \tau_0 \frac{(M/M_0)}{L/L_0}$$

Where $\tau_0 = 2.75 \times 10^7$ years and M_0 is the solar mass, L_0 is the solar luminosity.

A fraction of this contraction time was used as the first estimate for time step in the model calculations. The first estimated time step was found from the following:

$$\Delta t = \tau \frac{(\Delta R)}{R} \quad 3.17 \times 10^7 \text{ seconds.}$$

B. Pre-Main-Sequence Mass Transfer

The study of pre-main-sequence mass transfer shows that a binary will evolve rapidly from an over-contact configuration to a stage where both stars will fill their Roche Lobes. Mass transfer during condensation has been proposed, e. g. Wood (1962). He described a formation mechanism for a close binary in which nuclei are poor in hydrogen compared to the mixture from which they are condensing. Whenever two condensing nuclei of comparable size are present, the formation of a double star, rather than a single star or planets may occur. The difference between the formation of a double star and a single star is that the double star is constrained by the inner critical equipotential surface known as the Roche Lobe. Wood argues that the more massive component would continue to attract the most gas.

Hayashi and Nakano (1965) and Nakano, Okyama and Hayashi (1968) proposed a method for the formation of a single star that could lead to the formation of a close binary. They proposed that the free-fall collapse of an opaque protostar is stopped by the bounce of a central core. For a protostar of one solar mass this takes approximately ten years. The bounce causes a shock wave.

The subsequent propagation of the shock wave toward the stellar surface causes a sudden flare-up. The star finally settles down to a quasihydrostatic equilibrium state and rapidly moves toward the Hayashi Track. If the protostar condenses with sufficient rotational angular momentum, the above theory will predict the formation of a rapidly rotating core. When the bounce shock occurs it could be non-spherical. The result may be the formation of a pre-main-sequence binary system by fission.

Yamasaki (1971) studied the case of a binary system immediately after fission of a collapsing protostar. He suggested that a substantial fraction of the matter would be crowded out of the critical lobes and would drift around the components. The total orbital angular momentum of the confined mass must be above the critical value to cause rotational instability. He assumed that the balance of the mass outside of the Roche Lobes would be lost from the outer Lagrangean point. The loss rate is a parameter of the problem. If only one component overfilled its Roche Lobe, then the whole excess mass was assumed to fall on the other component. It does not escape from the system provided that the other does not fill its Roche Lobe. The model calculations were based on a polytropic star with $n = 1.5$. This represents fully convective stars contracting on the Hayashi Track. The initial mass for all calculations was held constant at 13.5 solar masses. In all cases of stable mass transfer rates and mass loss rates,

the systems detached within several hundred years. For a critical value of mass exchange rate the system would not recover from the instability and form a single star. The final configurations of these models still had separations from 2 to 4 A. U. Although these separations are a minimum, they do not represent observable close binary systems.

The writer evaluated the case of pre-main-sequence mass transfer from the secondary to the primary. Table 1 shows the initial and final configuration after mass transfer.

TABLE 1

INITIAL AND FINAL CONFIGURATION OF MASS TRANSFER MODEL

	<u>INITIAL</u>	<u>FINAL</u>
$M1/M_{\odot}$	3.0	3.128
$M2/M_{\odot}$	1.5	1.372
Period (days)	3.0	3.459
Separation (A. U.)	0.067	0.074

The mass transfer rate is chosen to be 1×10^{-7} solar mass per year. This is representative of observed rates in semidetached binary systems, (e. g., Hall and Neff; 1976). Table 2 shows the calculated models of the secondary during mass transfer. Column 1 is the model number. Column 2 is the age of the model in seconds. Column 3 is the logarithm of the luminosity in solar units. Column 4 is the logarithm of the effective temperature. Column 5 is the ratio of the radius to the Roche Lobe. Finally, column 6 is the radius in solar units. The mass transfer stops

when the secondary is smaller than its Roche Lobe. The initial radius of the secondary is arbitrarily chosen to be 20% greater than the Roche Lobe. Conservation of angular momentum and of mass requires the binary system to increase in separation during mass exchange. Therefore, the Roche Lobes of each star increase as the mass ratio increases. The mass transfer stops within 28 years for this case. This is similar to the results found by Yamaski (1971). The initial configuration chosen by the writer is immediately after the binary components form a minimum contact binary. Both components will fill their Roche Lobes initially.

TABLE 2

MODELS OF THE SECONDARY DURING MASS TRANSFER

MODEL	TIME	LOG (L/LSUN)	LOG (T_{EFF})	ROCHE ER	R/RSUN
1	2.506E+07	4.8421	3.2855	1.19	5.50
3	6.452E+07	4.7893	3.2888	1.17	5.45
5	1.044E+08	4.7364	3.2920	1.16	5.39
7	1.446E+08	4.6834	3.2953	1.14	5.34
9	1.855E+08	4.6304	3.2985	1.12	5.29
11	2.310E+08	4.5772	3.3018	1.11	5.23
13	2.830E+08	4.5239	3.3051	1.09	5.18
15	3.423E+08	4.4705	3.3083	1.08	5.13
17	4.101E+08	4.4170	3.3116	1.06	5.08
19	4.876E+08	4.3634	3.3149	1.04	5.03
21	5.761E+08	4.3097	3.3181	1.03	4.98
23	6.773E+08	4.2558	3.3214	1.01	4.93
25	7.930E+08	4.2019	3.3247	1.00	4.88
27	9.254E+08	4.1478	3.3279	.98	4.83

C. Basic Assumptions for the Binary Model

The proposed model represents a pre-main-sequence binary star system. The initial configuration introduced is constrained by the Roche Lobes. The basic assumptions which must be made are as follows:

1. The first law of thermodynamics requires mass and energy to be conserved both for the individual stars and the binary system as a whole.
2. The second law of thermodynamics requires that the entropy for any closed system be greater than or equal to zero. This means that there is no external source (or sink) of energy available to do work. The system dynamics are determined from the initial conditions.
3. The binary system obeys conservation of angular momentum. Circular, Keplarian orbits were assumed.
4. The stars are spherically symmetric. Thus, we are assuming that the stars are not affected by rotation during the model calculations.
5. The stars are in quasihydrostatic equilibrium. This assumption is required to calculate each model. A contracting star is not, by definition, in hydrostatic equilibrium. Yamasaki (1971) showed each contraction occurs over a time step which is long compared to the dynamical time scale of readjustment. Thus, the approximation of hydrostatic equilibrium is good.

D. Equations of Stellar Structure

There are four basic equations of stellar structure:

$$\frac{dP}{dr} = - \frac{GM(r)}{r^2} \quad \text{hydrostatic equilibrium}$$

$$\frac{dM(r)}{dr} = 4\pi\rho r^2 \quad \text{continuity of mass}$$

$$\frac{dL(r)}{dr} = 4\pi\rho\epsilon r^2 \quad \text{thermal equilibrium}$$

and either

$$\frac{dT}{dr} = \frac{3}{4ac} \frac{\kappa_P}{T^3} \frac{L(r)}{4\pi r^2} \quad \text{for radiative equilibrium}$$

or

$$\frac{1}{T} \frac{dT}{dr} = \frac{\gamma - 1}{\gamma} \frac{1}{P} \frac{dP}{dr} \quad \text{for convective equilibrium}$$

Where $M(r)$ and $L(r)$ are the mass and luminosity at radial distance r .

Along with these four differential equations we must have the following relations:

$P = P(\rho, T, \text{chemical composition})$	the equation of state
$\kappa = \kappa(\rho, T, \text{chemical composition})$	the Opacity
$\epsilon = \epsilon(\rho, T, \text{chemical composition})$	the energy generation rate per unit mass

The boundary conditions for this problem are as follows:

$$\begin{aligned}
 \text{At } r = 0, \quad M(r) &= 0 \\
 L(r) &= 0 \\
 \text{At } r = R, \quad T &= T_{\text{eff}} \\
 P &= 0 \\
 M(r) &= M
 \end{aligned}$$

A polytropic star is one which obeys an equation of the following form:

$$P = K\rho^{\frac{1}{n} + 1}$$

Since the pressure is an explicit function of density only, polytropic stars are determined by the equation of hydrostatic equilibrium and the equation of continuity of mass. By combining these two equations and using dimensionless variables, one differential equation defines the structure of a polytropic star:

$$\frac{1}{\xi^2} \frac{d}{d\xi} \left(\xi^2 \frac{d\theta}{d\xi} \right) = -\theta^n$$

This is known as the Lane-Emden equation. The variables are defined as follows with the subscript c indicating the core values.

$$\theta^n = \frac{\rho}{\rho_c}$$

$$\theta = \frac{T}{T_c}$$

$$\xi = \frac{r}{r_n}$$

Where r_n is known as the Emden unit of length:

$$r_n = \left[\frac{(n+1) P_c}{4\pi G \rho_c^2} \right]^{\frac{1}{2}}$$

In addition, we have

$$R = \xi_1 r_n$$

The polytropic model provides a fair approximation to the structure of certain types of real stars. This idealized model is often useful in qualitative and in rough quantitative discussions and aid considerably in gaining an overall insight into the structure of stars, (e. g. Cox and Guili; 1968).

E. The Hayashi Track

Hayashi (1961) proposed a phase of gravitational contraction of a convective star known as the Hayashi Track. This is shown in Figure 1 as the nearly vertical line, A-B, on the Hertzsprung-Russell diagram. The convection may result from the large opacities caused by ionizing hydrogen. The adiabatic relation between the pressure and temperature is a good approximation for most of the mass of completely convective stars.

$$P = K T^{2.5}$$

Here, the ratio of specific heats, γ , is constant and equal to 5/3. Even including the photosphere, this adiabatic relationship is a good approximation.

For stars in convective equilibrium, the adiabatic temperature-pressure relation can be rewritten in terms of Schwarzschild dimensionless variables as

$$p = Et^{2.5}$$

where $p = \{(4\pi/G)R^4/M^2\} P$ and $t = \{(R/G)R/\mu M\} T$

and $E = 4\pi K(\mu/R)^{2.5} G^{1.5} M^{0.5} R^{1.5}$

If the convective envelope extends all the way to the center of the star, then a limiting value of E for completely convective stars can be found to be:

$$E = 45.48$$

Hayashi described the "Forbidden Region" for a star of a given mass to be to the right of the line A-B. Line A-B represents the surface solution for the luminosity based on the limiting value of E . A star finding itself in this forbidden region would not be in hydrostatic equilibrium and would have to adjust itself to another structure on roughly a "free-fall" time scale.

The luminosity for fully convective gravitationally contracting stars, can be found by solving for radiative transfer in the photosphere. Cox and Giuli (1968) found a solution for the luminosity for stars with

$$L \geq L_0$$

to have a strong dependence on the effective temperature in the following form:

$$L \propto C^{\text{B1}} \mu^{\text{B2}} M^{\text{B3}} T_{\text{eff}}^{\text{B4}}$$

By assuming complete ionization of hydrogen at the base of the photosphere, the equation for the luminosity has been shown to be:

$$L \propto C^{-9} \mu^{0.9} M_*^{1.56} T_{\text{eff}}^{-16.9}$$

Schatzman (1963) found the solution for the luminosity in terms of solar type population I chemical composition and mass to be:

$$L_h = 10^{-.87} M_*^{5.2} T_{\text{eff}}^{-15.3} \quad (\text{Equation 1})$$

Where M_* is the stellar mass in solar units.

F. The Gravitational Contraction

For a pre-main sequence star, the only significant sources of energy come from the gravitational potential. The relationship between the gravitational contraction and luminosity can be determined from the equation of thermal equilibrium:

$$\frac{dL}{dr} = 4\pi r \rho^2$$

By using the ideal gas law, allowing the ratio of specific heats, γ , to be equal to 5/3, and defining $\epsilon = \epsilon_n + \epsilon_g$, the equation for thermal equilibrium becomes

$$\frac{dL}{dr} = 4\pi r^2 \rho \left\{ \epsilon_n - \frac{3}{2} \rho^{2/3} \frac{d}{dt} \left(\frac{P}{\rho^{5/3}} \right) \right\}$$

By using the equation for hydrostatic equilibrium the following relationship holds:

$$\frac{3}{2} \rho^{2/3} \frac{d}{dt} \left(\frac{P}{\rho^{5/3}} \right) = - \frac{3}{2} \frac{P}{\rho} \frac{1}{R} \frac{dR}{dt}$$

Substituting, $\epsilon_n = 0$ into the equation of thermal equilibrium we get the following:

$$\frac{dL}{dr} = - 6\pi r^2 \frac{P}{R} \frac{dR}{dt}$$

Now this relation is rearranged in the form of polytropic variables:

$$\frac{dL}{dr} = - 6\pi r_n^2 \xi^2 P_c \theta^{n+1} \frac{1}{R} \frac{dR}{dt}$$

Finally, the $\frac{dR}{dt}$ being rewritten in different form and by noting that $\Delta R = \xi_1 \Delta r_n$, the relation becomes

$$\frac{dL}{dr} = - 6\pi r_n P_c \xi \frac{2\theta^{n+1}}{\xi_1} \frac{\Delta R}{\Delta t}$$

Where ΔR is the radial contraction and Δt is the time step for the contraction, the total contribution to luminosity from a gravitational contraction of a polytrope is found by integration:

$$L_g = - 6 \pi P_c r_n^2 \frac{\Delta r_n}{\Delta t} \int_0^{\xi_1} \xi^2 \theta^{n+1} d\xi \quad (\text{Equation 2})$$

where $\xi_1 = 3.65375$ for $n = 1.5$ and $\xi_1 = 6.89685$ for $n = 3.0$.

This relation for the luminosity has the term $\frac{\Delta r_n}{\Delta t}$. The Δr_n represents the polytropic radial contraction while Δt is the corresponding time step. Δr_n is selected simply to optimize computing time. The time step, on the other hand, must be determined from the Virial Theorem and conservation of energy.

The Virial Theorem simply states that half the energy made available by a contraction causes an increase in the stellar temperature, while the other half is radiated away. The potential energy Ω is given by:

$$\Omega = + \frac{1}{2} \int_0^R V dM_r$$

For a polytrope the potential energy is given by:

$$-\Omega = \left(\frac{3}{5-n} \right) \frac{GM^2}{R}$$

If only half the potential energy is available for the luminosity, then the time step, Δt , is determined by

$$\Delta t = - \frac{2\Omega}{\langle L \rangle}$$

where $\langle L \rangle$ is the average value of the luminosity for corresponding time step. Therefore, we have

$$\Delta t = t_{i+1} - t_i = \frac{1}{2} \left(\frac{3}{5-n} \right) \frac{GM^2}{\langle L \rangle} \left(\frac{1}{R_{i+1}} - \frac{1}{R_i} \right)$$

(Equation 3)

and $\langle L \rangle = \frac{1}{2} (L_{i+1} + L_i)$

where the index i corresponds to the i th model.

The problem then is to determine, by an iterative procedure, selfconsistent values for the new value of the luminosity L_{i+1} and the time step $t_{i+1} - t_i$. An initial guess for the time step was obtained from the Kelvin-Helmholtz time scale for contraction onto the main-sequence. The estimate was obtained by proportioning the time scale for the radial contraction step. An estimate for the luminosity, L' , is calculated for the polytrope. An estimate for the time step, $\Delta t'$, is calculated from L' . Then using $\Delta t'$ a new value of the luminosity, L'' , is calculated and compared to L' . If L' is greater than L'' , then a new increased time step, $\Delta t''$, is estimated. Likewise, if L' is less than L'' , then the new estimate for the time step is decreased. This can be written as follows:

$$\Delta t = \Delta t'' \pm |\Delta t' - \Delta t''|^{\frac{1}{2}}$$

where " $+$ " was used if $L'' < L'$ or " $-$ " was used if $L'' > L'$. The primed values are the old estimates and the double prime indicates the new estimate. After L'' and L' approach each

other to the desired accuracy then L'' is set equal to L_{i+1} . The time step, $\Delta t''$, is stored for that model as Δt and becomes the first estimate for the time step for the next model.

G. Nuclear Energy Sources

If the assumption is that no contraction takes place then the equation for thermal equilibrium becomes

$$\frac{dL_n}{dr} = 4\pi r^2 \rho \epsilon_n$$

By using the appropriate polytropic variables and the nuclear energy generation rate ϵ_n for the proton-proton reaction, the luminosity is

$$L_n = 4\pi r_n^3 \rho_c^2 T_c^4 \epsilon_0 X^2 \int_0^{\xi} l \xi^{2n+4} d\xi \quad (\text{Equation 4})$$

where $\epsilon_0 \approx 10 \times 10^{-30}$ ergs/sec/gm and X is the hydrogen fraction of stellar material.

The nuclear luminosity is calculated and compared to the luminosity of the "zero-age" main-sequence star of corresponding mass. The model calculations ended when L_n approached the main-sequence value.

The time that a particular component of the binary remained on the main-sequence is considered to evaluate the systems. Generally the primary should reach the main-sequence before the secondary. It is of interest whether

the primary has enough time to evolve off of the main-sequence before the secondary can reach the main-sequence. A logarithmic regression is performed on data published by Iben (1965), and Strothers (1963) (1964) (1966). The following Table 3 represents mean published values for the time on the main-sequence t_{MS} , Novotny (1973).

TABLE 3
TIME ON THE MAIN-SEQUENCE

M/M_O	$\log M/M_O$	$\log t_{MS}$
60	1.7782	6.4914
45	1.6532	6.5563
30	1.4771	6.6721
15	1.1761	7.0043
9	.9542	7.3242
5	.6990	7.8088
3	.4771	8.3443
2.25	.3522	8.7259
1.5	.1761	9.2966
1.25	.0969	9.6053
1.0	0	10.0086
0.5	-.3010	10.4771
0.25	-.6021	10.8541

The following relationship can be used to represent the above logarithmic values: (The maximum error is less than 5% over the entire range of masses.)

$$\log t_{MS} = (-2.00998) \log \left(\frac{M}{M_O} \right) + 9.62409$$

In all cases evaluated, the secondary has sufficient time to contract onto the main-sequence before the primary evolves away.

H. Initial Conditions

With the masses of each component and their period being free parameters, the Roche Lobe for each star was determined by the program. The following relation, given by Paczynski (1971) for the Roche radius, R_R , was used:

$$R_R = A (0.38 + 0.2 \log (M_1/M_2))$$

The Roche radius was determined for each star and was taken to be the initial stellar radius for the first model of each star. The program then calculated the sequence of contraction models.

The chemical composition is chosen to be of population I type and assumed to be the same for each star. The hydrogen fraction, X , is selected to be 0.750, the helium fraction, Y , selected to be 0.224, and the heavy metal fraction, Z , is selected to be 0.026. This selection is arbitrary but is chosen to allow comparison with the work of Iben (1965).

The total mass for each model is between 2.5 and 6 solar masses. Eleven close binary systems are chosen from Giannone and Giannuzzi (1974). The parameters are listed in Table 4. Column 1 is the name of the System. Column 2 is the period in days. Column 3 is the mass in solar units

for both the primary and the secondary. Column 4 is the logarithm of their luminosities in solar units. Finally, column 5 is the logarithm of their effective temperatures.

TABLE 4
OBSERVED SEMIDETACHED BINARY SYSTEMS

<u>SYSTEM</u>	<u>PERIOD</u>	<u>M/M_O</u>	<u>LOG (L/L_O)</u>	<u>LOG (T_{EFF})</u>
TV Gas	1.243	3.10	2.070	4.029
		1.39	1.028	3.787
IN Aur	1.245	2.97	1.999	4.029
		0.89	0.203	3.679
U Cep	2.493	3.19	2.066	4.079
		1.53	0.875	3.678
AI Dra	1.199	2.18	1.467	3.982
		1.03	0.650	3.756
δ Lib	2.327	2.96	1.976	3.982
		1.31	0.770	3.675
β Per	2.867	3.15	2.082	4.079
		0.74	0.797	3.696
U Sge	3.381	4.27	2.593	4.134
		1.60	0.573	3.567
V505 Sag	1.183	2.22	1.501	3.958
		1.18	0.414	3.693
X Tri	0.972	1.72	1.044	3.947
		1.00	0.000	3.642
TX U Ma	3.063	3.13	1.997	4.079
		0.90	1.088	3.746
W U Mi	1.701	2.68	1.824	3.947
		1.19	0.541	3.681

I. Description of the Model Program

The program calculates both stellar model sequences simultaneously. This allows comparison of time steps and structure of each component when possible. The initial mass of each component and the period of the binary are parameters of each model sequence. Each observable system can be evaluated in turn.

Figure 2 represents a flow chart for the pre-main-sequence model program. By using the Kelvin-Helmholtz contraction time, an estimate for the time step, Δt , is made for the initial radial contraction ΔR . The initial value of the luminosity, L' , is arbitrarily chosen from the mass-luminosity relation for main-sequence stars:

$$\log \left(\frac{L}{L_0} \right) = 4.1 \log \left(\frac{M}{M_0} \right) - 0.1$$

The radial contraction, Δr_n , was chosen in all cases to be

$$(\Delta r_n)_{i+1} = \frac{0.005 R_i}{\xi_1}$$

A polytropic model is calculated for both $n = 1.5$ and $n = 3$. By using Equation 2, the first value for L_g is calculated. The effective temperature is calculated by using the following relation:

$$T_{\text{eff}}^4 = \frac{L}{4\pi\sigma R^2}$$

By using Equation 1, the Hayashi Track luminosity, L_h , is found and compared to the radiative luminosity, L_g . If $L_g < L_h$, then L_g is chosen; if not, then L_h is chosen. Now the time step can be calculated from the Virial Theorem using Equation 3. If the old value for the luminosity L' is equal to L'' within sufficient accuracy, then the procedure is stopped; if not, the time step is adjusted

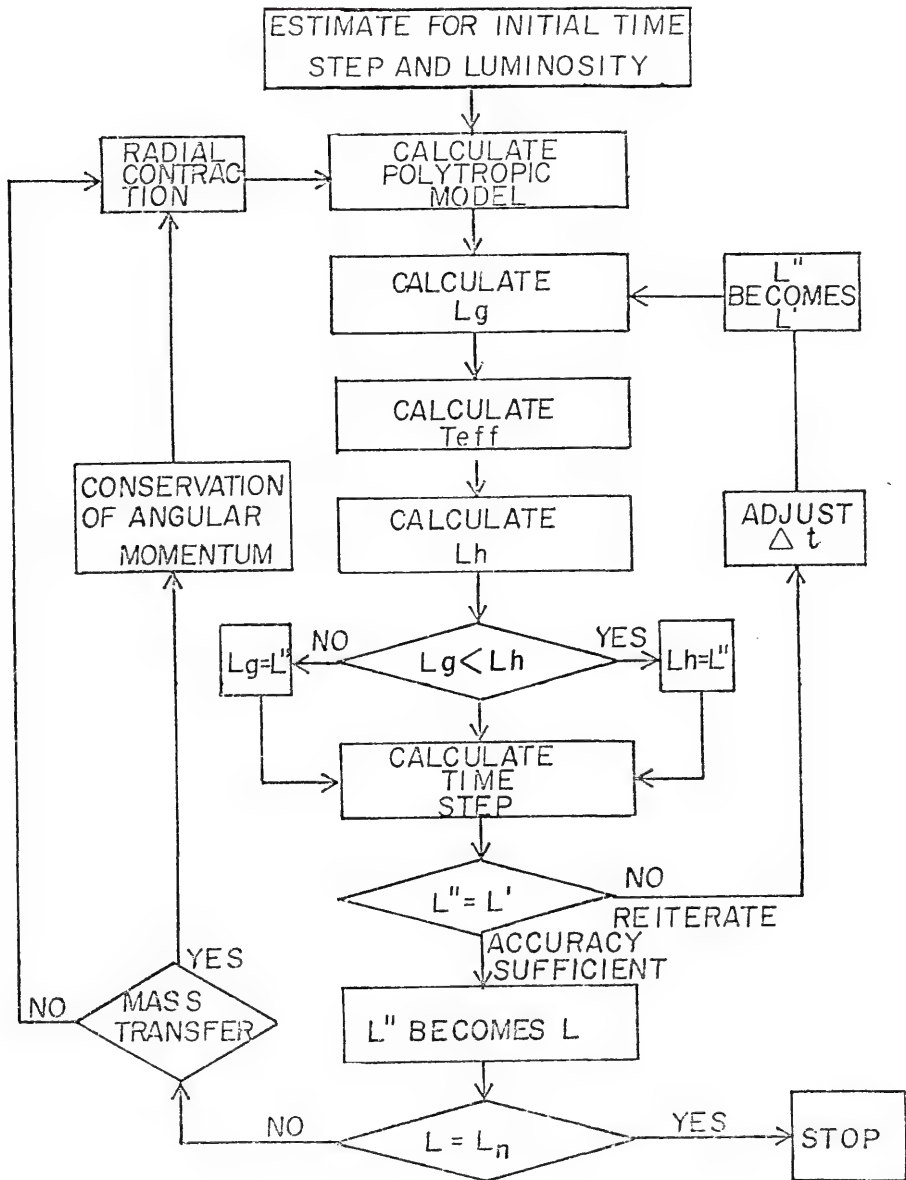


FIGURE 2. Flow chart of the program for the pre-main-sequence model

as described previously and the procedure starts over again. After the error between L'' and L' is less than 1 part in 10^5 , the values for R , T_{eff} , L , and Δt are stored for that model. If the program limits have been met, L_h is large enough; the program stops; if not a radial contraction is made and the procedure is restarted.

Appendix A lists the main program, all subroutines and polytropic constants. The language is Honeywell's Mark III version of General Electric Company's BASIC.

A test model is compared with the evolutionary tracks published by Iben (1965). The primary for the test model is 3 solar masses, the secondary is 1.5 solar masses, and the period is 3 days. Initially both stars are filling their Roche Lobes and are on the Hayashi Track. Figure 3 shows the plots of the test model and Iben's pre-main-sequence tracks for single stars on the Hertzsprung-Russell diagram. The initial point for Iben's models is labeled "0". The points 1 through 5 can be used for age comparisons with the test model. Table 5 shows the ages at these points labeled on the evolutionary tracks in Figure 3 for each star. The same numbering is used for the test model. The test model tabulation for both the primary and the secondary can be found in Appendix B. Each table has 6 columns. Column 1 is the model number after the initial model. Column 2 is the accumulated time in seconds after the initial model.

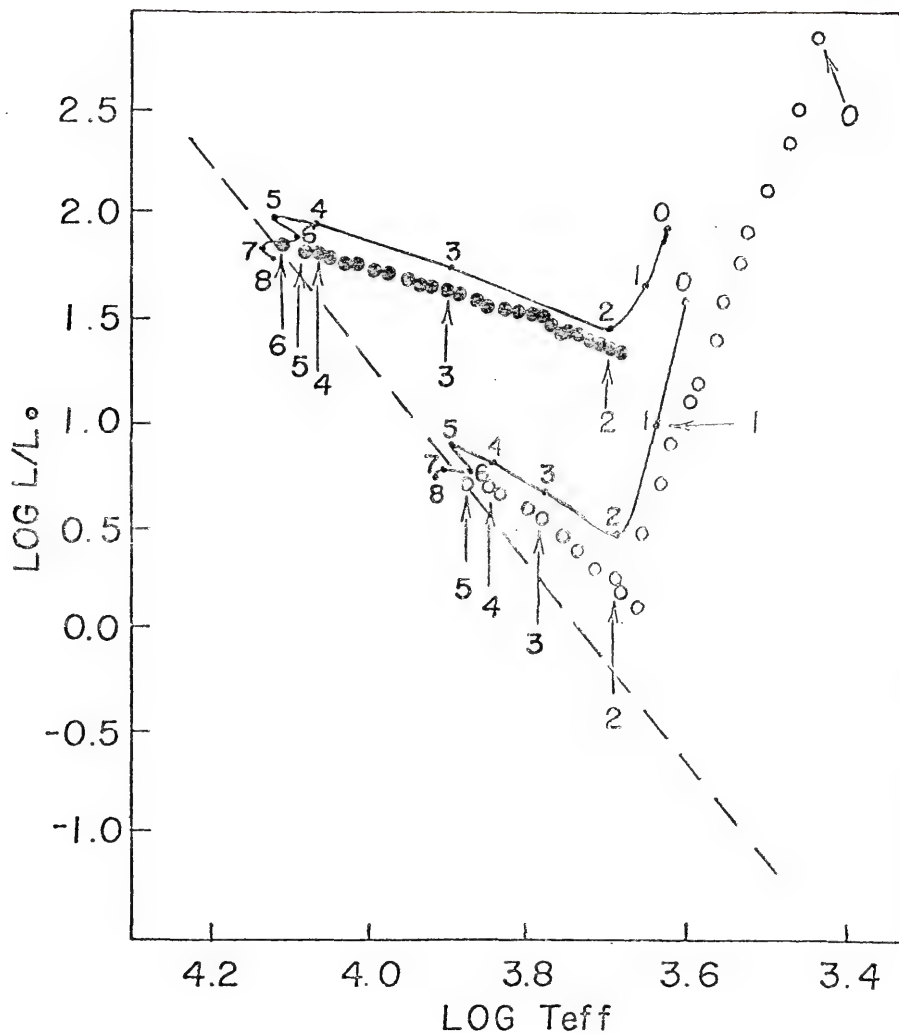


FIGURE 3. Evolutionary tracks of a pre-main-sequence test model for a binary ($\bullet = 3M_{\odot}$, $\circ = 1.5 M_{\odot}$) and the evolutionary tracks for single stars published by Iben (1965).

TABLE 5

COMPARISON OF AGE (10^6 YEARS) FOR THE TEST MODEL

<u>PRIMARY = 3 $M_{\odot}$</u>			<u>SECONDARY = 1.5 $M_{\odot}$</u>	
<u>AGE POINT</u>	<u>IBEN</u>	<u>TEST MODEL</u>	<u>IBEN</u>	<u>TEST MODEL</u>
1	0.034	---	0.23	0.205
2	0.208	0.06	2.36	1.391
3	0.763	0.747	5.80	3.483
4	1.135	1.202	7.58	4.962
5	1.250	1.351	8.62	5.949
6	1.465	1.432	10.43	---
7	1.741	---	13.39	---
8	2.514	---	18.21	---

Column 3 is the logarithm of the luminosity in solar units. Column 4 is the logarithm of the effective temperature. Column 5 is the ratio of the model radius to that of its Roche Lobe. Finally, column 6 is the radius of the model in solar units.

These ages and evolutionary tracks of the test model show reasonable agreement with Iben's results. Up to point 5, the age of a component of the test model compares with the age of Iben's models. Suggestions for future improvements and changes are discussed in Chapter IV. The major differences in ages occur near the main-sequence. These differences are caused by the limitations of a polytropic model to adjust for the core's changing chemical composition. In particular, Iben followed the depletion of C^{12} in detail. Normally, C^{12} is maintained in equilibrium for the CN reaction chain. However, during the pre-main-sequence contraction the CN reaction has not started.

Only very near the main-sequence is there sufficient thermal energy in the core to initiate this reaction. C^{12} must be depleted to form the equilibrium concentrations of the "secondary" elements in the CN reaction chain. After equilibrium is reached, the concentration of C^{12} remains constant. This resulted in slowing down the contraction near the main-sequence as C^{12} was depleted in the core. The test model is polytropic and cannot follow detail changes in stellar structure. It is intended as a survey tool to determine whether or not a binary system is pre-main-sequence.

CHAPTER III

RESULTS OF THE NUMERICAL CALCULATIONS

The age computed by the writer's model is the time after both components filled their Roche Lobes. It may not be the same as would be calculated for a single star contracting onto the main-sequence.

Appendix C lists the numerical values for each of the pre-main-sequence models calculated as described in the previous chapter. The Appendix C contains 22 tables. Each table is identified by the name of the binary system. Each table has 6 columns. Column 1 is the model number after the initial model. Column 2 is the accumulated time in seconds after the initial model. Column 3 is the logarithm of the luminosity in solar units. Column 4 is the logarithm of the effective temperature. Column 5 is the ratio of the model radius to that of its Roche Lobe. Finally, column 6 is the radius of the model in solar units.

The computed binary model and an observed binary system are compared by age and position on the Hertzsprung-Russell diagram. The ages of each component must match and the observed binary must fall near the evolutionary tracks

of the binary model for the systems to be pre-main-sequence. Individual systems are discussed in the following sections.

A. TV Cassiopeia

It appears unlikely that TV Cassiopeia is a pre-main-sequence binary. The secondary is either over-luminous or it has too great an effective temperature. This is in contradiction to the results published by Field (1969) for TV Cassiopeia. Field determined the pre-main-sequence nature of the system by estimating the radii and age of each star. The estimate is made by interpolation of published models of a single star.

Figure 4 shows the plotted contraction of both components of a pre-main-sequence model for TV Cassiopeia on the Hertzsprung-Russell diagram. The observed luminosity and effective temperature for both components are plotted also. The problem of the over-luminosity of the secondary is clearly shown.

If the age of the primary can be determined from the model, it is approximately 6.3×10^5 years since the initial model. To estimate the age of the secondary, either the radiative solution or the Hayashi solution must assume to be correct. Comparing the luminosity with that of the model secondary on the Hayashi Track yields an age of 1.5×10^5 years. If the radiative solution is assumed, the age is 3.1×10^5 years. This pre-main-sequence model does not fit the observed system for either case.

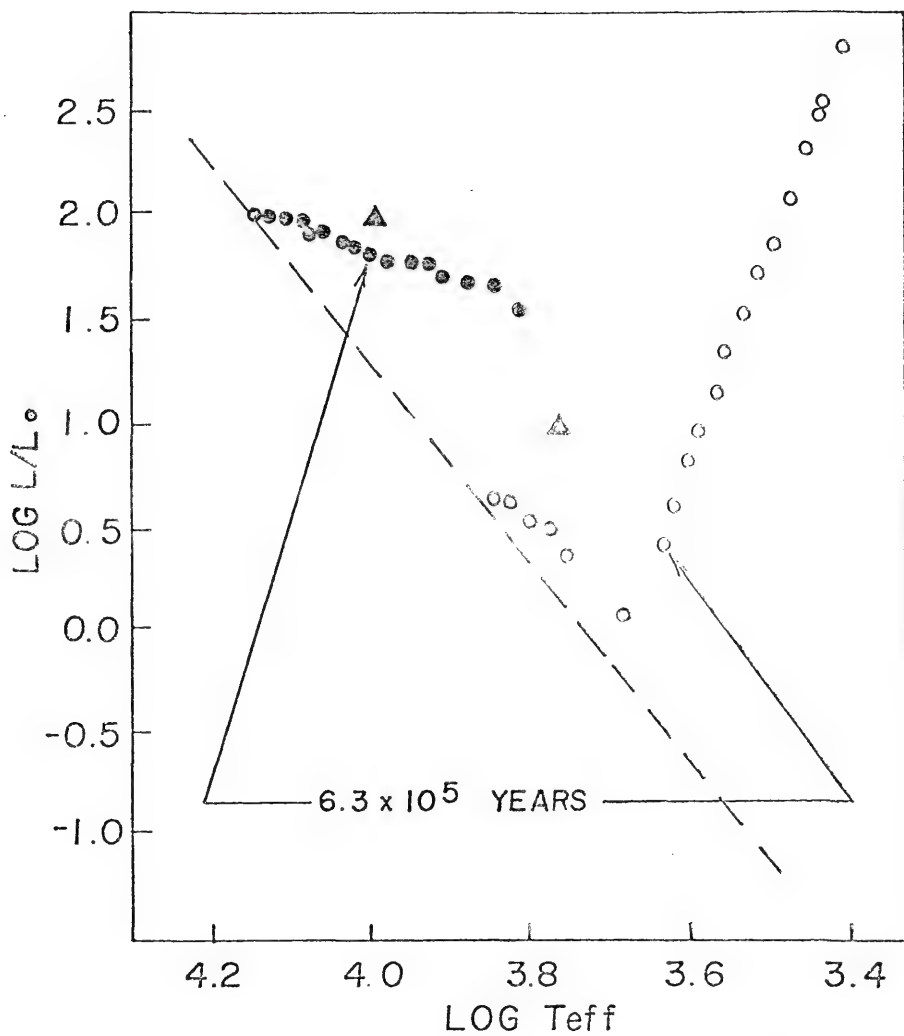


FIGURE 4. TV CASSIOPEIA ($\Delta = 3.1 M_{\odot}$, $\Delta = 1.39 M_{\odot}$). The evolutionary tracks of the pre-main-sequence binary model is represented by the circles (primary $\bullet$, secondary $\circ$).

B. IM Aurigae

Figure 5 shows the plotted contraction of a pre-main-sequence model for IM Aurigae on the Hertzsprung-Russell diagram. The observed stellar luminosity and effective temperature for both components also are plotted. The observed system falls close to the contraction paths of the pre-main-sequence model. However, the "ages" do not match.

The age of the primary seems to be 3.1×10^5 years. The age of the secondary appears to be between 9×10^5 and 3.1×10^6 years according to this model.

C. U Cephei

Figure 6 shows the plotted contraction of a pre-main-sequence model of U Cephei on the Hertzsprung-Russell diagram. The observed luminosity and effective temperature for both components also are plotted. This system appears to be pre-main-sequence.

First of all, the observed system falls close to the contraction path of the model. This is true for both components. Secondly, the ages match within 20% at 3.15×10^5 years if the secondary is on the Hayashi Track and has a slightly different chemical composition. Iben (1965)

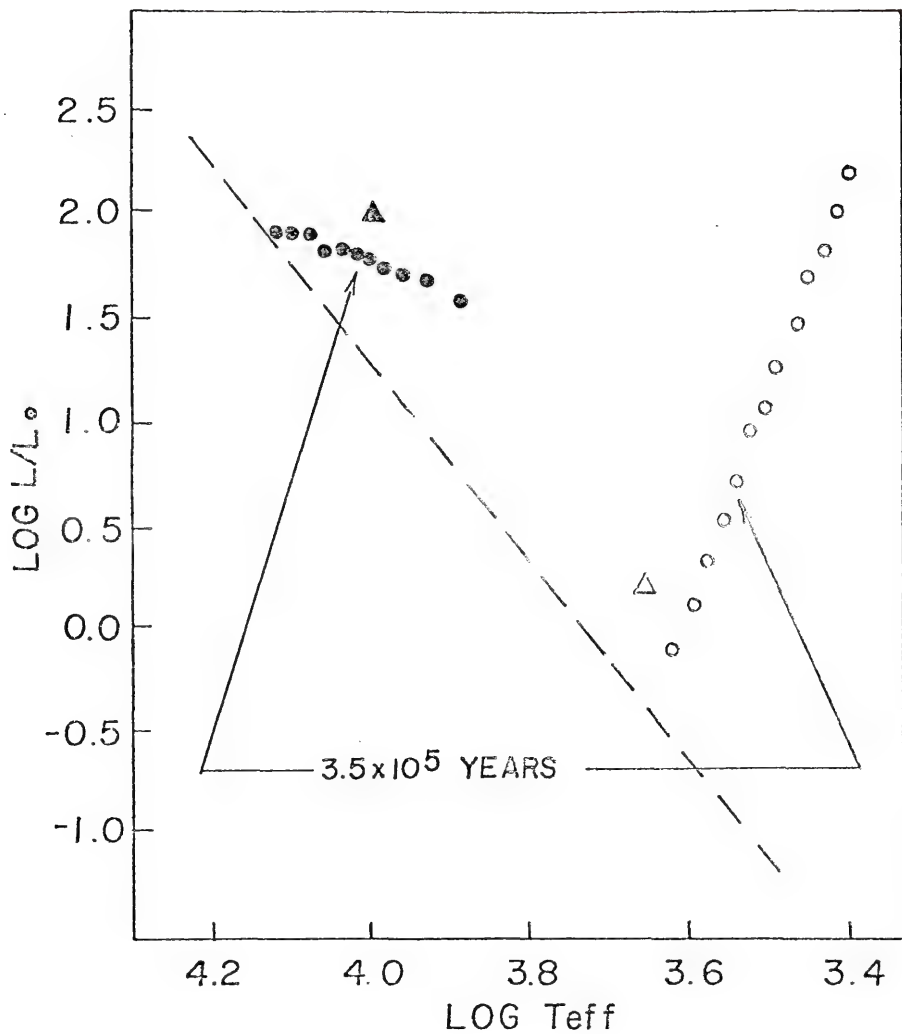


FIGURE 5. IM AURIGAE ($\Delta = 2.97 M_{\odot}$, $\Delta = 0.89 M_{\odot}$). The evolutionary tracks of the pre-main-sequence binary model is represented by the circles (primary $\bullet$, secondary $\circ$).

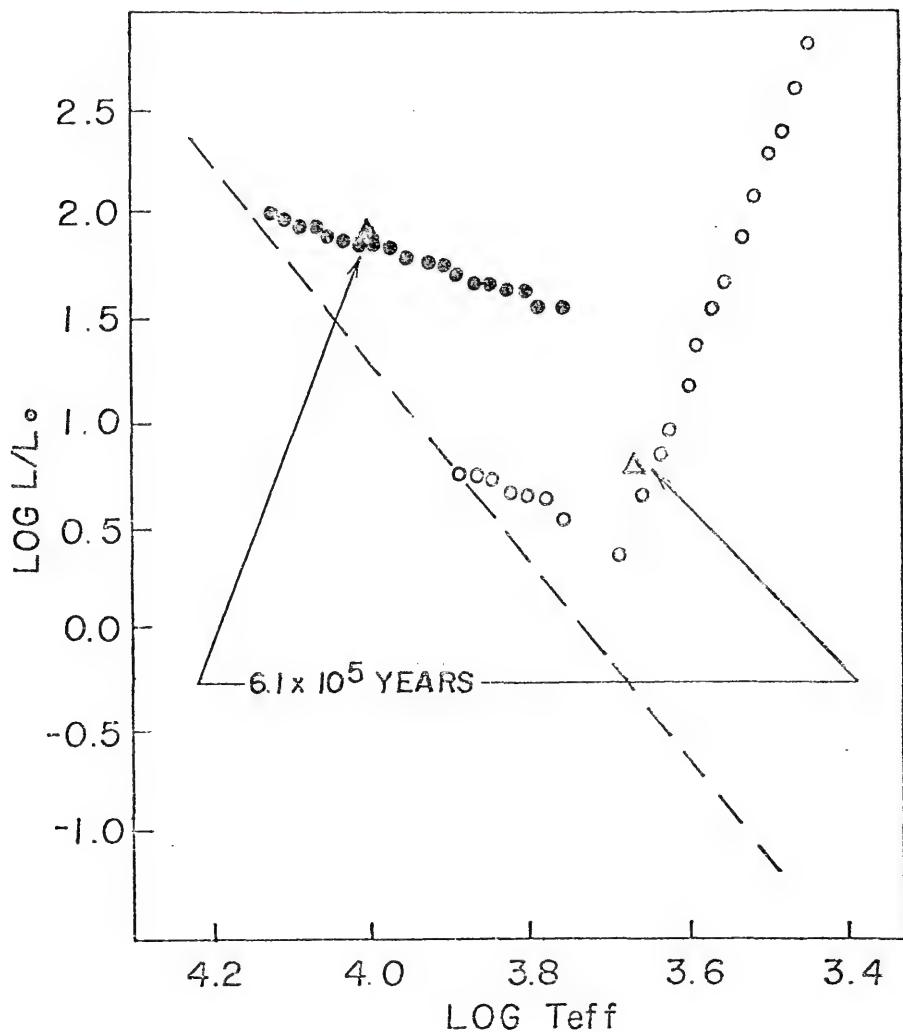


FIGURE 6. U CEPHEI ($M_1 = 3.19 M_{\odot}$, $M_2 = 1.53 M_{\odot}$). The evolutionary tracks of the pre-main-sequence binary model is represented by the circles (primary $\bullet$, secondary $\circ$).

showed a slight decrease in the metals composition would move the Hayashi Track toward higher effective temperatures. This would match ages and positions on the Hertzsprung-Russell diagram. This model predicts that U Cephei is a pre-main-sequence binary star system with population type I chemical composition for both components.

D. AI Draconis

Figure 7 shows both the path of the pre-main-sequence contracting model and the observed binary system AI Draconis plotted on the Hertzsprung-Russell diagram. The system does not appear to be a pre-main-sequence object according to this model. This problem seems to be the same as TV Cassiopeia. The ages do not match. The secondary component of the observable system is over-luminous; or the effective temperature is too high for it to be considered a pre-main-sequence star for this particular mass.

E. δ Librae

Figure 8 shows the pre-main-sequence contraction model for δ Librae plotted on the Hertzsprung-Russell diagram. The observed binary system may possibly be pre-main-sequence if it is assumed that the two stars have different chemical compositions. This would follow the description by Wood (1962) of the formation of a binary with different compositions. As stated before, Iben (1965) has shown that such a change in composition could increase the effective

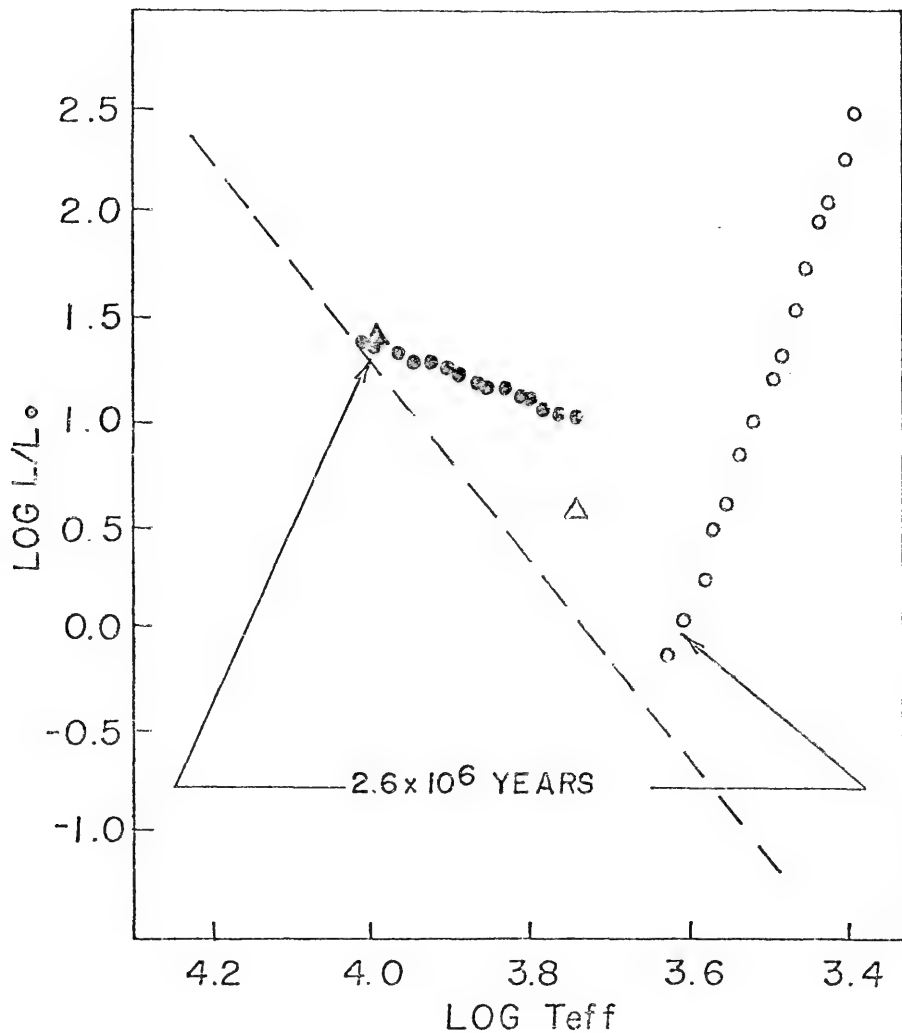


FIGURE 7. AI DRACONIS ($A = 2.18 M_{\odot}$, $A = 1.03 M_{\odot}$). The evolutionary tracks of the pre-main-sequence binary model is represented by the circles (primary $\bullet$, secondary $\circ$).

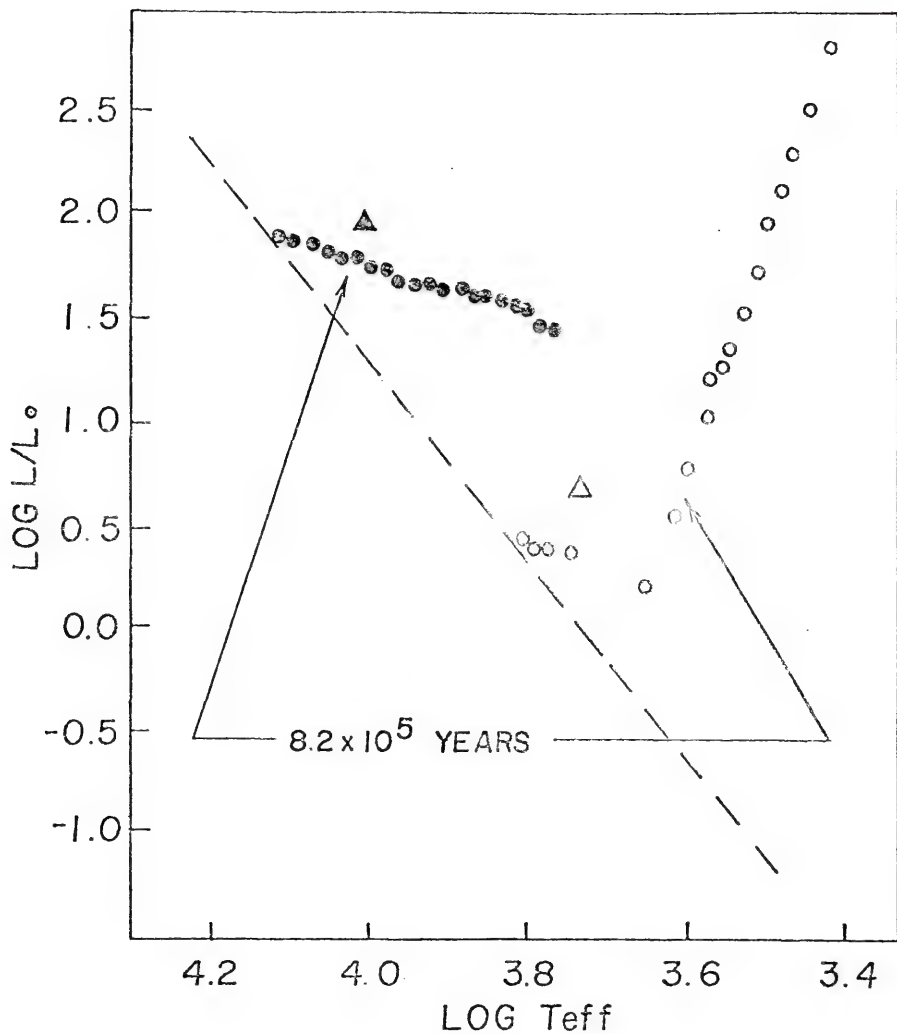


FIGURE 8. δ LIBRAE ($\Delta = 2.96 M_{\odot}$, $\Delta = 1.31 M_{\odot}$). The evolutionary tracks of the pre-main-sequence binary model is represented by the circles (primary $\bullet$, secondary $\circ$).

temperature of a star on the Hayashi Track. With this in mind, the ages of both components are in agreement. The age after both components filled their Roche Lobes is approximately 8.2×10^5 years.

F. β Persei

Figure 9 shows the observed binary β Persei plotted along with the path of a pre-main-sequence contracting model. This system does not fit the model for a pre-main-sequence binary star system. It suffers from the same problems as TV Cassiopeia and AI Draconis. The secondary is not represented by this pre-main-sequence model. The age is also a problem. If the chemical compositions are different enough to fit the model, the age for the secondary would be younger than the primary by a large factor. This is caused by the decrease in contraction time as the luminosity increases. The luminosity must be much higher for a given effective temperature for the secondary to fall on the Hayashi Track.

G. U Sagittae

Figure 10 shows the plot of the binary system U Sagittae on the Hertzsprung-Russell diagram. Comparing the evolutionary tracks of the model with the observed system, the binary could be pre-main-sequence. The ages of both stars appear to match at approximately 3.78×10^5

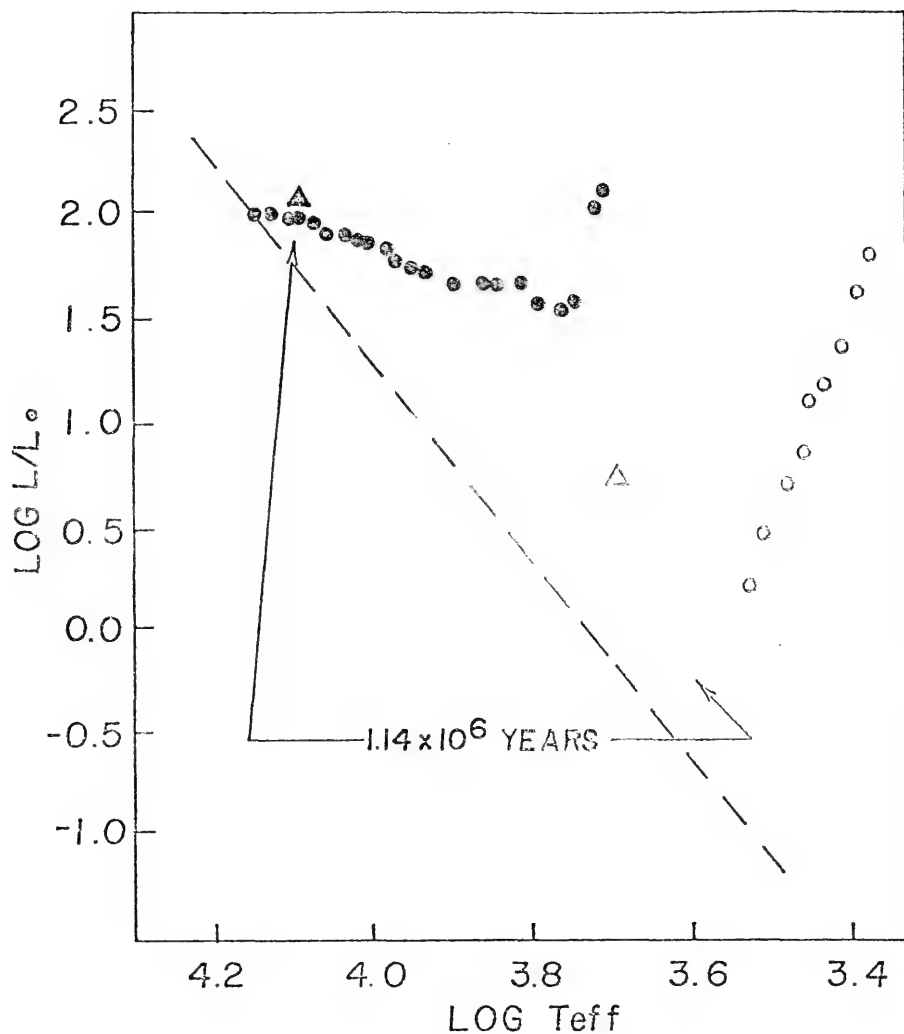


FIGURE 9. β PERSEI ($M_1 = 3.15 M_{\odot}$, $M_2 = 0.74 M_{\odot}$). The evolutionary tracks of the pre-main-sequence binary model is represented by the circles (primary $\bullet$, secondary $\circ$).

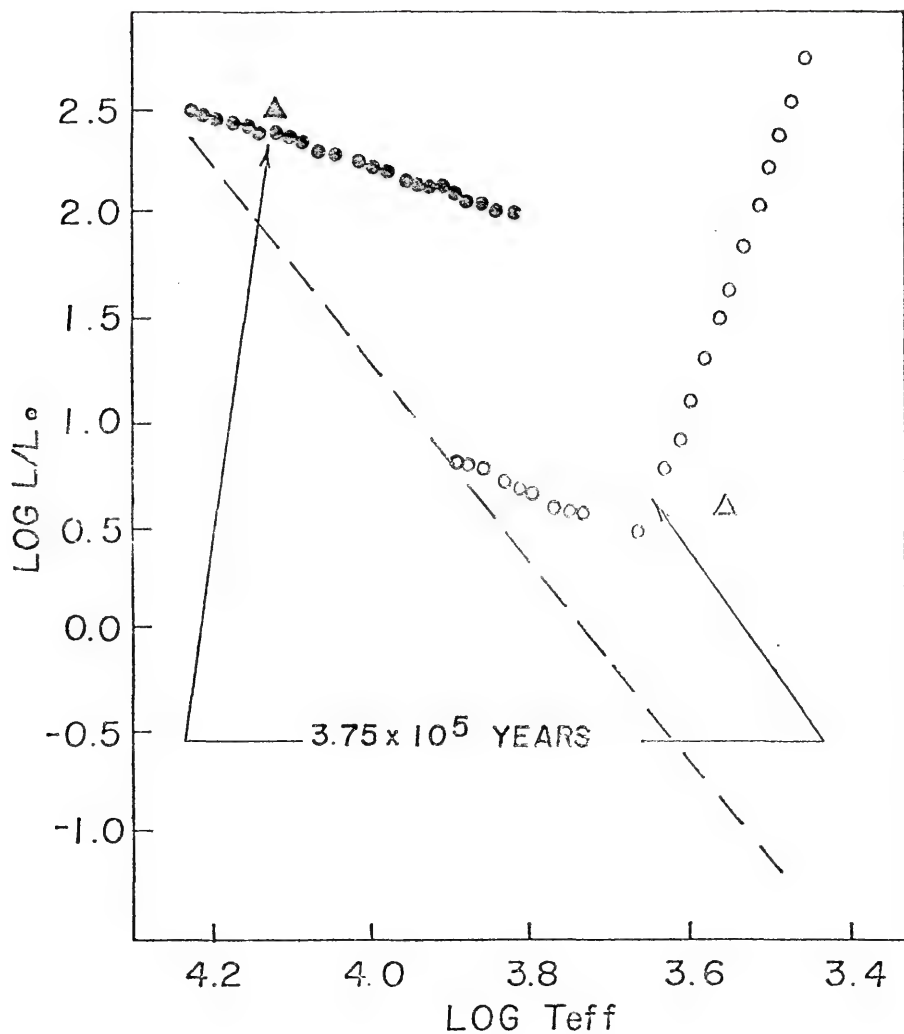


FIGURE 10. U SAGITTAE ($\Delta = 4.27 M_{\odot}$, $\Delta = 1.60 M_{\odot}$). The evolutionary tracks of the pre-main-sequence binary model is represented by the circles (primary $\bullet$, secondary $\circ$).

years. An increase in metals content of the secondary would move the Hayashi Track toward lower effective temperature. U Sagittae is probably a pre-main-sequence object. Therefore, another alternative is that U Sagittae may not have a fully convective pre-main-sequence secondary.

The secondary falls in the forbidden region described by Hayashi. If this is actually the case, then the star is not in hydrostatic equilibrium, and its structure would be changing rapidly. Larson (1969) described pre-main-sequence contractions that may not be on the Hayashi Track. These evolutionary tracks had rapidly varying luminosities as a function of effective temperature, caused by different depths of the convective envelope.

H. V505 Sagittarii

Figure 11 shows the paths of a contracting pre-main-sequence model plotted on the Hertzsprung-Russell diagram. Both components of the observable binary system V505 Sagittarii are plotted along with the model. By using the same argument that the components could have slightly different chemical compositions, the system could be pre-main-sequence. The age of the system would be approximately 1.89×10^6 years.

I. X Trianguli

Figure 12 shows the paths of the contracting binary model and both components of the binary X Trianguli plotted

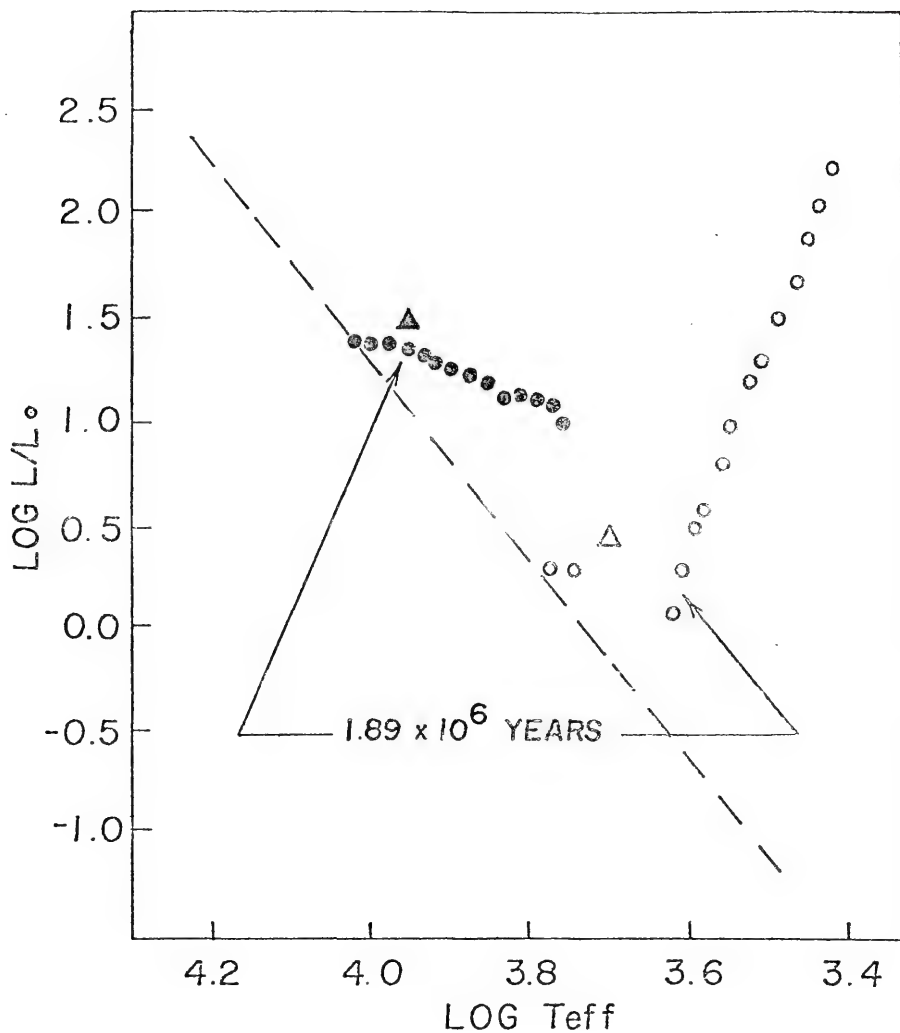


FIGURE 11. V505 SAGITTARII ($\Delta = 2.22 M_{\odot}$, $\Delta = 1.18 M_{\odot}$). The evolutionary tracks of the pre-main-sequence binary model is represented by the circles (primary $\bullet$, secondary $\circ$).

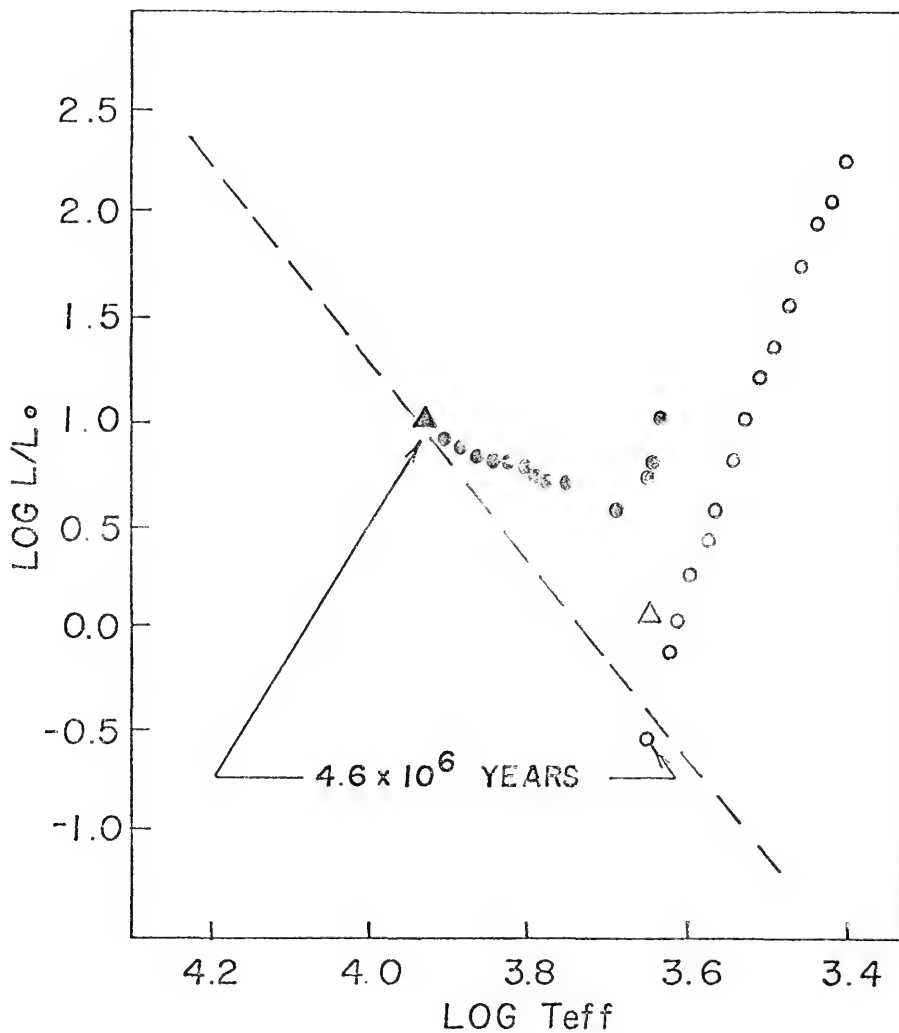


FIGURE 12. X TRIANGULI ($M = 1.72 M_{\odot}$, $M = 1.00 M_{\odot}$). The evolutionary tracks of the pre-main-sequence binary model is represented by the circles (primary $\bullet$, secondary $\circ$).

on the Hertzsprung-Russell diagram. The observed binary system falls close to the pre-main-sequence path of the model. The ages, however, do not quite match. The difference in the ages is a little less than a factor of two. This could possibly be caused by a difference in chemical composition. If we allow for a slight increase in effective temperature, caused by a decrease in heavy metals, then the time of contraction would decrease. This is required by conservation of energy and the Virial Theorem. With these assumptions the binary X Trianguli could possibly be a pre-main-sequence object.

J. TX Ursae Majoris

Figure 13 shows the observed binary TX Ursae Majoris plotted on the Hertzsprung-Russell diagram. The contracting pre-main-sequence model is plotted also. The system does not appear to fit the model. The age would have to be $\approx 9.5 \times 10^5$ years as determined by the primary. This yields the same problems that were found with β Persei and others. The secondary is over-luminous for a pre-main-sequence star with this particular mass.

K. W Ursae Minoris

Figure 14 shows the observed contact binary system W Ursae Minoris plotted on the Hertzsprung-Russell diagram. The path of the contracting pre-main-sequence model also

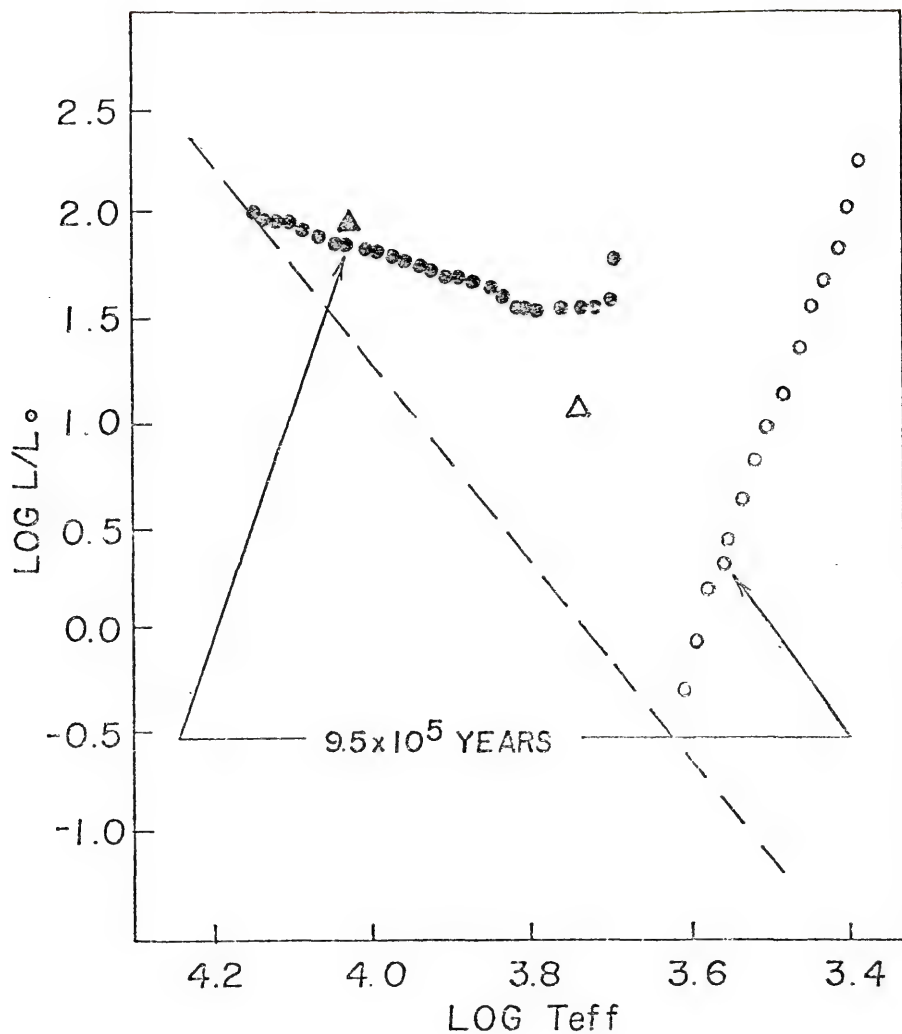


FIGURE 13. TX URSAE MAJORIS ($\Delta = 3.13 M_{\odot}$, $\Delta = 0.90 M_{\odot}$). The evolutionary tracks of the pre-main-sequence binary model is represented by the circles (primary $\bullet$, secondary $\circ$).

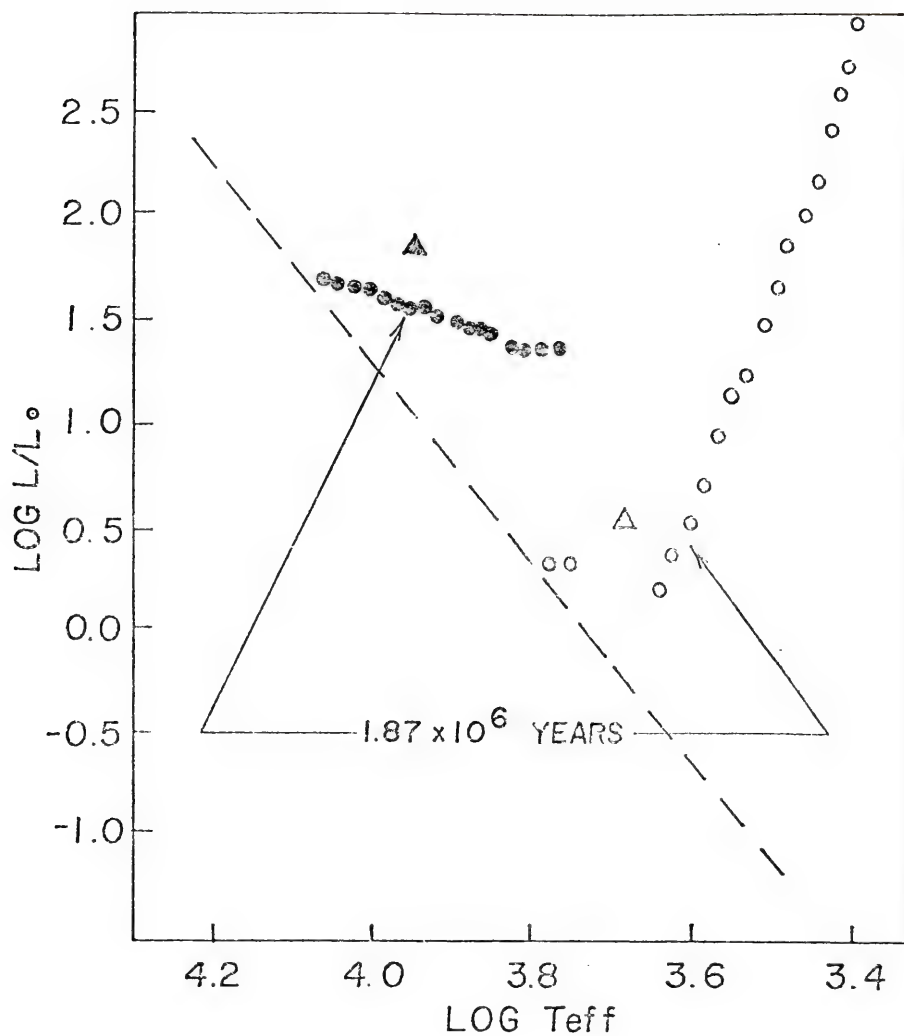


FIGURE 14. W URSAE MINORIS ($\Delta = 2.68 M_{\odot}$, $\Delta = 1.19 M_{\odot}$). The evolutionary tracks of the pre-main-sequence binary model is represented by the circles (primary $\bullet$, secondary $\circ$).

is plotted. Both components of the observable system are relatively close to the path of the model. The exciting part of this analysis is that the ages for the pre-main-sequence model match at about 1.87×10^6 years for a system slightly different from the observed system. Iben (1965) showed that an increase in metals could account for the increased luminosity of the primary on the radiative path. He also showed that a decrease in metals could increase the effective temperature for the secondary on the Hayashi Track. The results of this model cannot be discounted concerning the possible pre-main-sequence nature of W Ursae Minoris.

CHAPTER IV

CONCLUSION AND DISCUSSION

This binary model allows discovery of pre-main-sequence systems. Initially both stars must be forced into their inner equipotential surfaces rapidly. Evolutionary tracks calculated from this initial configuration define a new means for evaluating actual binary systems.

The major conclusions of this evaluation are as follows:

1. Pre-main-sequence close binary star systems can be found by comparing observed binaries with this model. Some observed closed binary systems are found to fit this pre-main-sequence model.
2. The chemical composition of the two components of the pre-main sequence binaries appeared to be slightly different. Even though the actual differences in composition were not quantified, both stars could still be considered population type I.
3. There does not seem to be a correlation between the orbital angular momentum, ages, or mass ratios for the pre-main-sequence binary systems.

Table 6 summarizes the evaluation of the eleven binaries. The distribution falls fairly evenly into three groups, those binaries that are likely to be pre-main-sequence, those that are possibly, and those that are unlikely to be. Improvements in the model could allow better determination of the pre-main-sequence nature of a binary system. A more realistic model, instead of assuming a polytropic structure would guarantee more accurate structure and age determination. It would allow for changing the chemical composition of both stars. The close binary systems under consideration most likely are in synchronous rotation. The periods are approximately a few days. This rotation has been neglected in the calculations, but it surely would slow the gravitational contraction to some extent.

Roxburgh (1967) evaluated the effects of rotation and magnetic fields on pre-main-sequence evolution of binary systems. Rotation of an individual star could be uniform or differential. Uniform rotation requires a large viscosity of the stellar material to couple the core to the envelope. If the star is in convective equilibrium or has a sufficiently large magnetic field (>1 Gauss), then the viscosity of the stellar material should be great enough to allow uniform rotation. In this case, Roxburgh predicts loss of material at the stellar equator. Thus, rotating pre-main-sequence stars in convective equilibrium will follow a more vertical Hayashi Track.

TABLE 6

SUMMARY OF BINARY SYSTEMS COMPARED WITH THE PRE-MAIN-SEQUENCE MODEL

SYSTEMS	AGE OF THE PRIMARY (10^6 YEARS)	PRE-MAIN-SEQUENCE		ANGULAR MOMENTUM IN SOLAR UNITS		M_1/M_2
		UNLIKELY	POSSIBLY	LIKELY		
A. TV Cas	0.63	X			.445	2.23
B. IM Aur	0.35		X		.254	3.34
C. U Cep	0.61			X	.552	2.08
D. AI Dra	2.6	X			.226	2.11
E. δ Lib	0.82		X		.443	2.25
F. β Per	1.14	X			.294	4.25
G. U Sge	0.375		X		.795	2.66
H. V505 Sag	1.89		X		.257	1.88
I. X Tri	4.6			X	.170	1.72
J. η X U Ma	0.95	X			.359	3.47
K. W U Mi	1.87			X	.339	2.25

Stars in radiative equilibrium do not have the "convective viscosity" mechanism. They are more likely to approach the critical angular momentum value and fission may result. He concludes that contact binary systems could be formed by fission of a single pre-main-sequence star on the radiative track. For binary systems that are formed before they reach the radiative track, the rotational angular momentum should not reach the critical value. Both components should be in synchronous rotation and most of the angular momentum would be orbital.

Bierman and Hall (1976) and Oliver (1978) evaluated the possibility that RS Canum Venaticorum systems could be pre-main-sequence. Their arguments were based on space densities and probabilities assigned by evaluating ages. Because of the large number of these systems, they concluded that they must be post-main-sequence. This conclusion is valid as long as the universe is the accepted cosmological age. However, there is no direct observational evidence that these systems must be post-main-sequence. The writer would like to apply an appropriate pre-main-sequence model to RS Canum Venaticorum type systems. Bierman and Hall concluded that RS Canum Venaticorum system resulted from the fission of a post-main-sequence star. It would be interesting to model a thermal contraction of a hydrogen depleted secondary. This may represent a binary immediately after fission.

In studies of pre-main-sequence and post-main-sequence evolution, the origin of a forming system is assumed. The writer is assuming the origin of the binary system. Clayton (1978) and Larson (1978) and others have presented theories for stellar formation. They admit that unresolved problems remain. These include gas dispersion, viscosities, and turbulences within a collapsing gas cloud. The problems are more severe for the formation of a binary star system. Many scientists have assumed the origin when mathematical modeling beyond a particular point is difficult or impossible. Whitcomb and Morris (1961) have proposed special creation beyond the known laws of physical science. Special creation states that God created the universe (Genesis 1:1). He created each object with a specific purpose (I Corinthians 15:40, 41)

. . . There are also celestial bodies and bodies terrestrial: but the glory of the celestial is one, and the glory of the terrestrial is another. There is one glory of the sun, and another glory of the moon, and another glory of the stars: for one star differeth from another star in glory.

APPENDIX A

PRE-MAIN-SEQUENCE BINARY MODEL PROGRAM LISTING

```

160 DIM H(2,250)
170 DIM E(2,250)
180 DIM E(2,250)
190 DIM I(2)
200 DIM M(2)
210 DIM N(2)
220 DIM G(2,2)
230 DIM R(2,2)
240 DIM P(2,2)
250 DIM O(2)
260 DIM S(2)
270 DIM C(2)
280 DIM W(2,2)
290 DIM Y(2)
300 DIM B(2)
310 DIM T(2,250)
320 DIM V(2,250)
330 DIM A(2,250)
340 DIM B(2,250)
342 PRINT"PRIMARY NAME=?"
344 INPUT AS
350 PRINT"NO. OF ITERATIONS?"
360 INPUT NI
370 PRINT"MASS OF PRIMARY, SECONDARY?"
380 INPUT M(1), M(2)
382 PRINT"POCHE LOBE FRACTION (O1,O2) =?"
384 INPUT O1,O2
390 PRINT"PERIOD IN DAYS="
392 INPUT P1
394 PRINT"MASS TRANSFER RATE (MO/YEAR) =?"
396 INPUT T1
402 REM CONTRACTION CONSTANT IS C1
405 GOSUB 5600
410 C1=0.005
420 S(1)=M(1)+1.001E+33
430 S(2)=M(2)+1.001E+33
440 Q(1)=A1*1.5E+13*(0.38+0.2+1.03*(M(1)/M(2))/2.30250)
450 Q(2)=A1*1.5E+13*(0.38+0.2+1.03*(M(2)/M(1))/2.30250)
455 REM INITIAL POCHE CONDITIONS
460 R(1,1)=Q(1)+O1
470 R(2,1)=Q(2)+O2
500 REM CALC MEAN MOLECHULAR WT.
510 Y=0.75
520 Y=0.223
530 Z=0.227
540 W=1/(2+Y+Z+Y/4+Z/2)

```

```

560 REM M2=POLYTROPIC INDEX
570 M2=3
580 GOSUB 5200
600 REM CALC A SERIES OF M1/M2 MODELS
610 X1=0
620 FOR I=1 TO 2
630 GOSUB 2000
640 NEXT I
650 FOR I=1 TO M1
660 FOR I=1 TO 2
662 G1=G(I,2)
664 D1=D(I,2)
665 GOSUB 6600
670 IF J<2 THEN 700
680 GOSUB 6000
690 GOSUB 7600
700 GOSUB 2200
710 GOSUB 2400
715 FOR K=1 TO 10
720 GOSUB 2600
730 IF G(I,2)=0 THEN 750
740 IF ABS((G2-G(I,2))/G(I,2))<0.00001 THEN 800
750 GOSUB 2800
754 IF G2>G(I,2) THEN 760
756 D(I,2)=D(I,2)+(ABS(D(I,2)-D2))+*0.5
758 GOTO 770
760 D(I,2)=D(I,2)-(ABS(D(I,2)-D2))+*0.5
770 G(I,2)=G2
780 NEXT K
800 REM CONTINUE
810 G(I,1)=G1
820 D(I,1)=D1
840 GOSUB 6400
850 I1=5.50465+R(I,1)-20.6884
855 I1=I1-.5
860 IF I1>A(I,1) THEN 1000
880 GOSUB 4800
890 V(I,1)=V(I,I-1)+D(I,2)
905 U(I,1)=P(I,2)/6.06E+10
910 NEXT I
920 GOSUB 6800
930 GOSUB 7200
940 GOSUB 7000
950 GOSUB 7400
970 NEXT I

```

```

1000 REM  ROUTINES TO GENERATE OUTPUT
1010 GOSUB 4600
1020 STOP
2000 REM  SUBROUTINE TO EST.  $\eta$ =DELTA
2010  $I(I)=10+(4.1+LOG(W(I)))/2.30250-0.1$ 
2040  $\eta(I,1)=(8.72275+14)+W(I)+(1-Q1)/I(I)$ 
2050  $\eta(I,2)=\eta(I,1)$ 
2060  $\rho(I,2)=\rho(I,1)+Q1$ 
2070  $G(I,1)=I(I)$ 
2080 RETURN
2200 REM  SUBROUTINE TO CALC POLYTROPIC MODEL
2230  $w(I,1)=\rho(I,1)/Q$ 
2240  $w(I,2)=\rho(I,2)/Q$ 
2250  $C(I)=S(I)/((12.56637)+w(I,2)+3*\eta)$ 
2260  $Y(I)=(9.370255E-7)+w(I,2)+2*((\eta2+1)*C(I)+(1/\eta2-1))$ 
2270  $P(I)=Y(I)*C(I)*+(1+1/\eta2)$ 
2280  $T(I,1)=11+(1.212014E-3)+\rho(I)/C(I)$ 
2290 RETURN
2400 REM  SUBROUTINE TO CALC NUCLEAR LUMINOSITY
2410  $I0=10E-30$ 
2420  $I1=2*LOG(C(I))/2.30250$ 
2430  $I2=LOG(12.56637*I0*\eta3*Y*+2)/2.30250$ 
2440  $I3=3*LOG(w(I,2))/2.30250$ 
2450  $I4=4*LOG(T(I,1))/2.30250$ 
2460  $\eta(I)=10+(I1+I2+I3+I4)$ 
2480 RETURN
2600 REM  SUBROUTINE TO CALC THE GRAV. LUMINOSITY
2610  $I0=w(I,1)-w(I,2)$ 
2620 IF  $I0<0$  THEN 2720
2640  $I2=LOG(13.8425+33*I0+\rho(I)/\eta(I,2))/2.30250$ 
2650  $I3=2*LOG(w(I,2))/2.30250$ 
2660 IF  $I2+I3>38$  THEN 1000
2670  $G2=10+(I2+I3)$ 
2720 RETURN
2800 REM SUBROUTINE TO CALC NEW DELTA= $\eta$  FROM GRAV. LUM.=G
2810 IF  $X1=00000$  THEN 2880
2830  $I1=2*LOG(S(I))/2.30250$ 
2840  $I2=LOG(1/\rho(I,2)-1/\rho(I,1))/2.30250$ 
2850  $I3=LOG((G2+G(I,1))/2)/2.30250$ 
2860  $I4=-6.022780-LOG(5-\eta2)/2.30250$ 
2870  $\eta2=10+(I1+I2-I3+I4)$ 
2880 RETURN
3000 REM  SUBROUTINE TO CALC AN AVERAGE GRAV. LUMINOSITY
3020  $G(I,2)=(G(I,2)+G(I,1))/2$ 
3030 RETURN

```

```

4600 REM SUBROUTINE TO GENERATE TABLES
4630 FOR I=1 TO 2
4631 I1=0
4632 FOR K=1 TO 30
4634 PRINT" "
4636 NEXT K
4640 COSUR 5800
4650 PRINT" "
4655 PRINT" " MODEL TIME LOG(I/4,SIN) LOG(TREE)
4660 PRINT" "
4670 FOR I=1 TO N1
4680 I1=I1+1
4690 IF I1<50 THEN 4760
4700 FOR K=1 TO 14
4705: ### ##.###^0000 #.#### #.#### #.##
4710 PRINT" "
4720 NEXT K
4730 PRINT" " MODEL TIME LOG(I/4,SIN) LOG(TREE)
4740 PRINT" "
4750 I1=0
4760 PRINT USING 4705,I,V(I,I),A(I,I),B(I,I),E(I,I),H(I,I)
4770 NEXT I
4780 NEXT I
4800 REM SUBROUTINE FOR RADIAL CONTRACTION
4810 I1=R(I,2)
4820 IF X1=00000 THEN 4900
4830 R(I,2)=R(I,2)+C1
4840 R(I,1)=I1
4890 RETURN
5200 REM SUBROUTINE TO SET POLYTROPIC CONSTANTS
5210 IF N2=1.5 THEN 5320
5270 C=6.80685
5280 D=2.0182
5290 G3=0.901686
5300 N3=0.181544
5310 RETURN
5320 C=3.65375
5330 D=2.7141
5340 G3=.020754
5350 N3=.26325
5360 RETURN
5600 REM SUBROUTINE TO CALC SEPARATION FROM ORBITAL PERIOD
5605 IC=P1/2365.25
5610 I1=I0+*2
5620 I2="I(1)+"(2)
5630 A1="(I1+I2)++.233333
5640 I1="((A1/(I(1)+"(2)))+*0.5)*I(1)+"(2)
5650 RETURN

```

```

5800 REM SUBROUTINE TO PRINT HEADINGS
5810 PRINT " "
5820 PRINT " "
5830 PRINT "MASS=",M(I),"SOLAR MASSES"
5840 PRINT "SEPARATION=",A(I),"A.U."
5850 PRINT "PERIOD=",P(I),"DAYS"
5855 IF T1=0 THEN 5870
5860 PRINT "MASS TRANSFER RATE=",T1,"SOLAR MASSES PER YEAR"
5870 FOR V=1 TO 44
5872 PRINT " "
5874 NEXT V
5880 RETURN
6000 REM SUBROUTINE TO CALC HAYASHI TRACK LUMINOSITY
6010 IF R(I,I-1)>3.65 THEN 6150
6050 I1=11.60+R(I,I-1)
6090 I2=5.2+LOG(M(I))/2.30250
6110 I3=42.03305+I2-I1
6120 IF I3<A(I,I-1) THEN 6150
6130 A(I,I-1)=I3
6150 RETURN
6400 REM SUBROUTINE TO CALC LOG(T) AND LOG(L)
6410 I1=N(I)+0(I,2)
6420 A(I,I)=LOG(I1)/2.30250-33.57278
6430 R(I,I)=LOG(6.12091+(I1/2(I,2)**2)**0.25)/2.30250
6440 RETURN
6600 REM SUBROUTINE TO DETERMINE POLYTROPE
6610 IF M(I)>2.0 THEN 6670
6620 IF I=1 THEN 6640
6630 IF R(I,I)>3.65 THEN 6670
6640 N2=1.5
6650 GOSUB 5200
6660 GOTO 6690
6670 N2=3.0
6680 GOSUB 5200
6690 RETURN
6800 REM SUBROUTINE TO CREATE MASS TRANSFER
6810 I1=T1
6820 I2=I1*0(2,2)/3.17E+7
6830 I3=I1+0(1,2)/3.17E+7
6835 IF F(2,I-1)<0.00 THEN 6860
6840 M(1)=M(1)+I2
6850 M(2)=M(2)-I2
6860 F(1,I)=M(1)
6870 F(2,I)=M(2)
6880 T1=I1
6890 RETURN

```

```

7200 REM SUBROUTINE TO CALC RATIO OF RADII TO RADIUS OF
7210 Q(1)=A1+1.5E+13+(0.3E+0.2+LOG(M(1)/M(2)))/2.30250
7220 Q(2)=A1+1.5E+13+(0.3E+0.2+LOG(M(2)/M(1)))/2.30250
7230 E(1,1)=P(1,2)/Q(1)
7240 E(2,1)=P(2,2)/Q(2)
7250 RETURN
7260 REM SUBROUTINE TO CALC NEW SEPARATION
7270 I1=I1+2
7280 I2=M(1)/(M(1)+M(2))
7290 I3=(1-I2)+2
7300 A1=I1/((M(1)+M(2))*(M(1)+2)+I2)
7310 RETURN
7320 REM SUBROUTINE TO CALC PERIOD FROM SEPARATION
7330 P1=(A1+2/(M(1)+M(2)))+0.5
7340 P1=P1+365.25
7350 RETURN
7360 REM SUBROUTINE TO CORRECT THE TIME DURING THE HAYASHI PHASE
7370 IF R(I,I-1) > 3.65 THEN 7720
7380 I1=2+LOG(S(I))/2.30250
7390 I2=LOG(1/R(I,2)-1/P(I,1))/2.30250
7400 I3=(10+A(I,I-1)+10+A(I,I-2))/2
7410 IF I3<44500 THEN 7450
7420 I3=44500
7430 I4=LOG(I3+3.82E+33)/2.30250
7440 I5=-6.002780-LOG(5-M2)/2.30250
7450 I6=10+((I1+I2-I4+I5)
7460 V(I,I-1)=V(I,I-1)-P(I,2)+I6
7470 RETURN
7480 END

```

APPENDIX B

TABLE B-1

PRE-MAIN-SEQUENCE BINARY TEST MODEL FOR THE PRIMARY

$$\text{MASS} = 3 \text{ } M_{\odot}$$

$$\text{PERIOD} = 3 \text{ days}$$

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	ROCHE FR	2/25 SUN
1	1.823E+11	1.2285	3.6832	.02	6.31
2	3.647E+11	1.3007	3.6855	.02	6.22
3	5.470E+11	1.3028	3.6872	.02	6.25
4	7.294E+11	1.3050	3.6888	.02	6.22
5	9.117E+11	1.3072	3.6904	.07	6.12
6	1.094E+12	1.3094	3.6921	.07	6.16
7	1.276E+12	1.3115	3.6937	.06	6.12
8	1.459E+12	1.3137	3.6953	.06	6.02
9	1.641E+12	1.3159	3.6970	.05	6.06
10	1.823E+12	1.3181	3.6986	.05	6.02
11	2.006E+12	1.3203	3.7002	.04	6.00
12	2.188E+12	1.3224	3.7018	.04	5.97
13	2.370E+12	1.3246	3.7035	.03	5.94
14	2.553E+12	1.3268	3.7051	.03	5.91
15	2.735E+12	1.3290	3.7067	.02	5.88
16	2.917E+12	1.3312	3.7084	.02	5.86
17	3.100E+12	1.3333	3.7100	.01	5.83
18	3.282E+12	1.3355	3.7116	.01	5.80
19	3.465E+12	1.3377	3.7133	.00	5.77
20	3.647E+12	1.3399	3.7149	.00	5.74
21	3.829E+12	1.3420	3.7165	.00	5.71
22	4.012E+12	1.3442	3.7182	.00	5.68
23	4.194E+12	1.3464	3.7198	.00	5.65
24	4.376E+12	1.3486	3.7214	.08	5.63
25	4.559E+12	1.3508	3.7231	.09	5.60
26	4.741E+12	1.3529	3.7247	.07	5.57
27	4.923E+12	1.3551	3.7263	.07	5.54
28	5.106E+12	1.3573	3.7280	.06	5.51
29	5.288E+12	1.3595	3.7296	.06	5.49
30	5.470E+12	1.3617	3.7312	.06	5.46
31	5.653E+12	1.3638	3.7329	.05	5.43
32	5.835E+12	1.3660	3.7345	.05	5.40
33	6.017E+12	1.3682	3.7361	.04	5.38
34	6.200E+12	1.3704	3.7378	.04	5.35
35	6.382E+12	1.3725	3.7394	.03	5.32
36	6.564E+12	1.3747	3.7410	.03	5.30
37	6.747E+12	1.3769	3.7427	.03	5.27
38	6.929E+12	1.3791	3.7443	.02	5.24
39	7.111E+12	1.3813	3.7459	.02	5.22
40	7.294E+12	1.3834	3.7476	.01	5.19
41	7.476E+12	1.3856	3.7492	.01	5.17
42	7.658E+12	1.3878	3.7508	.01	5.14
43	7.841E+12	1.3900	3.7525	.00	5.11
44	8.023E+12	1.3922	3.7541	.00	5.09
45	8.205E+12	1.3943	3.7557	.00	5.06
46	8.388E+12	1.3965	3.7574	.00	5.04
47	8.570E+12	1.3987	3.7590	.00	5.01
48	8.752E+12	1.4009	3.7606	.00	4.99
49	8.935E+12	1.4031	3.7623	.00	4.96

MODEL	TIME	LOG(L/LSUN)	LOG(TEMP)	POUR 52	PARSUM
50	0.117E+12	1.4052	3.7630	.77	4.24
51	0.202E+12	1.4074	3.7655	.77	4.01
52	0.482E+12	1.4096	3.7672	.77	4.30
53	0.664E+12	1.4112	3.7698	.76	4.26
54	0.846E+12	1.4140	3.7704	.76	4.34
55	1.003E+13	1.4161	3.7721	.76	4.32
56	1.021E+13	1.4183	3.7737	.75	4.70
57	1.030E+13	1.4205	3.7753	.75	4.77
58	1.058E+13	1.4227	3.7770	.74	4.74
59	1.076E+13	1.4248	3.7786	.74	4.72
60	1.094E+13	1.4270	3.7802	.74	4.70
61	1.112E+13	1.4292	3.7810	.73	4.67
62	1.130E+13	1.4314	3.7835	.73	4.65
63	1.140E+13	1.4336	3.7851	.73	4.63
64	1.167E+13	1.4358	3.7868	.72	4.60
65	1.185E+13	1.4370	3.7884	.72	4.58
66	1.203E+13	1.4401	3.7900	.71	4.56
67	1.222E+13	1.4423	3.7917	.71	4.53
68	1.240E+13	1.4445	3.7933	.71	4.51
69	1.258E+13	1.4467	3.7949	.70	4.49
70	1.276E+13	1.4488	3.7966	.70	4.47
71	1.295E+13	1.4510	3.7982	.70	4.44
72	1.313E+13	1.4532	3.7998	.69	4.42
73	1.331E+13	1.4554	3.8015	.69	4.40
74	1.349E+13	1.4576	3.8031	.69	4.38
75	1.368E+13	1.4597	3.8047	.69	4.36
76	1.386E+13	1.4619	3.8064	.69	4.33
77	1.404E+13	1.4641	3.8080	.68	4.31
78	1.422E+13	1.4663	3.8097	.67	4.29
79	1.440E+13	1.4685	3.8113	.67	4.27
80	1.459E+13	1.4707	3.8129	.67	4.25
81	1.477E+13	1.4728	3.8146	.66	4.23
82	1.495E+13	1.4750	3.8162	.66	4.21
83	1.513E+13	1.4772	3.8179	.66	4.19
84	1.532E+13	1.4794	3.8195	.65	4.16
85	1.550E+13	1.4816	3.8211	.65	4.14
86	1.568E+13	1.4838	3.8227	.65	4.12
87	1.586E+13	1.4859	3.8244	.64	4.10
88	1.605E+13	1.4881	3.8260	.64	4.08
89	1.623E+13	1.4903	3.8276	.64	4.06
90	1.641E+13	1.4925	3.8293	.63	4.04
91	1.659E+13	1.4947	3.8309	.63	4.02
92	1.677E+13	1.4969	3.8325	.63	4.00
93	1.696E+13	1.4990	3.8342	.62	3.97
94	1.714E+13	1.5012	3.8359	.62	3.95
95	1.732E+13	1.5034	3.8374	.62	3.91
96	1.750E+13	1.5056	3.8391	.61	3.89
97	1.769E+13	1.5078	3.8407	.61	3.87
98	1.787E+13	1.5100	3.8423	.61	3.83
99	1.805E+13	1.5122	3.8440	.61	3.86

MODEL	TIME	LOG(L/L _{SUN})	LOG(TEMP)	POURCE 50	D/D _{SUN}
100	1.823E+13	1.5143	3.8456	.60	3.24
101	1.842E+13	1.5165	3.8472	.60	3.22
102	1.860E+13	1.5187	3.8489	.60	3.20
103	1.878E+13	1.5200	3.8505	.59	3.77
104	1.896E+13	1.5231	3.8521	.59	3.77
105	1.914E+13	1.5252	3.8538	.59	3.75
106	1.933E+13	1.5275	3.8554	.58	3.72
107	1.951E+13	1.5297	3.8571	.58	3.71
108	1.969E+13	1.5318	3.8587	.58	3.69
109	1.987E+13	1.5340	3.8602	.58	3.67
110	2.006E+13	1.5362	3.8620	.57	3.66
111	2.024E+13	1.5384	3.8636	.57	3.64
112	2.042E+13	1.5406	3.8652	.57	3.62
113	2.060E+13	1.5428	3.8669	.56	3.60
114	2.079E+13	1.5450	3.8685	.56	3.58
115	2.097E+13	1.5472	3.8701	.56	3.56
116	2.115E+13	1.5494	3.8717	.56	3.55
117	2.133E+13	1.5516	3.8734	.55	3.53
118	2.151E+13	1.5537	3.8751	.55	3.51
119	2.170E+13	1.5559	3.8767	.55	3.49
120	2.188E+13	1.5581	3.8783	.55	3.48
121	2.206E+13	1.5603	3.8800	.54	3.46
122	2.224E+13	1.5625	3.8816	.54	3.44
123	2.243E+13	1.5647	3.8832	.54	3.42
124	2.261E+13	1.5669	3.8849	.53	3.41
125	2.279E+13	1.5691	3.8865	.53	3.39
126	2.297E+13	1.5713	3.8881	.53	3.37
127	2.316E+13	1.5735	3.8897	.53	3.36
128	2.334E+13	1.5757	3.8914	.52	3.34
129	2.352E+13	1.5779	3.8931	.52	3.32
130	2.370E+13	1.5801	3.8947	.52	3.31
131	2.389E+13	1.5823	3.8963	.52	3.29
132	2.407E+13	1.5845	3.8980	.51	3.27
133	2.425E+13	1.5867	3.8996	.51	3.26
134	2.443E+13	1.5889	3.9013	.51	3.24
135	2.461E+13	1.5911	3.9029	.51	3.22
136	2.480E+13	1.5933	3.9045	.50	3.21
137	2.498E+13	1.5955	3.9062	.50	3.19
138	2.516E+13	1.5977	3.9078	.50	3.18
139	2.534E+13	1.5999	3.9095	.50	3.16
140	2.553E+13	1.6021	3.9111	.49	3.14
141	2.571E+13	1.6043	3.9127	.49	3.12
142	2.589E+13	1.6065	3.9144	.49	3.11
143	2.607E+13	1.6087	3.9160	.49	3.10
144	2.625E+13	1.6110	3.9177	.48	3.08
145	2.644E+13	1.6132	3.9193	.48	3.07
146	2.662E+13	1.6154	3.9209	.48	3.05
147	2.680E+13	1.6176	3.9226	.48	3.04
148	2.698E+13	1.6198	3.9242	.47	3.02
149	2.717E+13	1.6220	3.9259	.47	3.01

MODEL	TIME	LOG(L/LSUN)	LOG(TEMP)	RAQUE ED	R/RSPIN
150	2.735E+13	1.6242	3.0275	.47	2.00
151	2.753E+13	1.6246	3.0201	.47	2.03
152	2.771E+13	1.6287	3.0308	.46	2.06
153	2.790E+13	1.6300	3.0324	.46	2.05
154	2.808E+13	1.6331	3.0341	.46	2.03
155	2.826E+13	1.6353	3.0357	.46	2.02
156	2.844E+13	1.6376	3.0374	.46	2.00
157	2.862E+13	1.6398	3.0390	.45	2.00
158	2.881E+13	1.6420	3.0407	.45	2.07
159	2.899E+13	1.6442	3.0423	.45	2.86
160	2.917E+13	1.6465	3.0439	.45	2.84
161	2.935E+13	1.6487	3.0456	.44	2.83
162	2.954E+13	1.6500	3.0472	.44	2.82
163	2.972E+13	1.6532	3.0489	.44	2.80
164	2.990E+13	1.6554	3.0505	.44	2.79
165	3.008E+13	1.6576	3.0522	.44	2.77
166	3.027E+13	1.6599	3.0538	.43	2.76
167	3.045E+13	1.6621	3.0555	.43	2.75
168	3.063E+13	1.6644	3.0571	.43	2.73
169	3.081E+13	1.6666	3.0588	.43	2.72
170	3.099E+13	1.6689	3.0604	.42	2.71
171	3.118E+13	1.6711	3.0621	.42	2.69
172	3.136E+13	1.6734	3.0637	.42	2.68
173	3.154E+13	1.6756	3.0654	.42	2.67
174	3.172E+13	1.6779	3.0670	.42	2.65
175	3.191E+13	1.6801	3.0687	.41	2.64
176	3.209E+13	1.6824	3.0703	.41	2.63
177	3.227E+13	1.6847	3.0720	.41	2.61
178	3.245E+13	1.6869	3.0737	.41	2.60
179	3.264E+13	1.6892	3.0753	.41	2.59
180	3.282E+13	1.6915	3.0770	.40	2.57
181	3.300E+13	1.6938	3.0786	.40	2.56
182	3.318E+13	1.6960	3.0803	.40	2.55
183	3.336E+13	1.6983	3.0819	.40	2.54
184	3.355E+13	1.7006	3.0836	.40	2.52
185	3.373E+13	1.7029	3.0853	.39	2.51
186	3.391E+13	1.7052	3.0869	.39	2.50
187	3.409E+13	1.7075	3.0886	.39	2.48
188	3.428E+13	1.7098	3.0903	.39	2.47
189	3.446E+13	1.7121	3.0919	.39	2.46
190	3.464E+13	1.7144	3.0936	.38	2.45
191	3.482E+13	1.7167	3.0952	.38	2.44
192	3.500E+13	1.7190	3.0969	.38	2.42
193	3.519E+13	1.7213	3.0986	.38	2.41
194	3.537E+13	1.7236	4.0002	.38	2.40
195	3.555E+13	1.7260	4.0019	.37	2.39
196	3.573E+13	1.7283	4.0036	.37	2.38
197	3.592E+13	1.7306	4.0053	.37	2.36
198	3.610E+13	1.7329	4.0069	.37	2.35
199	3.628E+13	1.7353	4.0086	.37	2.34

MODEL	TIME	LOG(L/LSUM)	LOG(TEFF)	ROCHE FR	R/RPSUM
200	3.646E+13	1.7377	4.0103	.37	2.32
201	3.665E+13	1.7400	4.0120	.36	2.32
202	3.683E+13	1.7424	4.0136	.36	2.30
203	3.701E+13	1.7448	4.0153	.36	2.29
204	3.719E+13	1.7471	4.0170	.36	2.28
205	3.737E+13	1.7495	4.0187	.36	2.27
206	3.756E+13	1.7519	4.0204	.35	2.26
207	3.774E+13	1.7543	4.0221	.35	2.25
208	3.792E+13	1.7567	4.0237	.35	2.24
209	3.810E+13	1.7591	4.0254	.35	2.23
210	3.829E+13	1.7615	4.0271	.35	2.21
211	3.847E+13	1.7639	4.0288	.35	2.20
212	3.865E+13	1.7663	4.0305	.34	2.19
213	3.883E+13	1.7688	4.0322	.34	2.18
214	3.902E+13	1.7712	4.0339	.34	2.17
215	3.920E+13	1.7736	4.0356	.34	2.16
216	3.938E+13	1.7761	4.0373	.34	2.15
217	3.956E+13	1.7786	4.0390	.34	2.14
218	3.974E+13	1.7810	4.0407	.33	2.13
219	3.993E+13	1.7835	4.0424	.33	2.12
220	4.011E+13	1.7860	4.0441	.33	2.11
221	4.029E+13	1.7885	4.0459	.33	2.10
222	4.047E+13	1.7910	4.0476	.33	2.09
223	4.066E+13	1.7935	4.0493	.33	2.07
224	4.084E+13	1.7961	4.0510	.32	2.06
225	4.102E+13	1.7986	4.0527	.32	2.05
226	4.120E+13	1.8011	4.0545	.32	2.04
227	4.138E+13	1.8037	4.0562	.32	2.03
228	4.157E+13	1.8063	4.0579	.32	2.02
229	4.175E+13	1.8089	4.0596	.32	2.01
230	4.193E+13	1.8115	4.0614	.31	2.00
231	4.211E+13	1.8141	4.0631	.31	1.99
232	4.230E+13	1.8167	4.0649	.31	1.98
233	4.248E+13	1.8192	4.0666	.31	1.97
234	4.266E+13	1.8220	4.0684	.31	1.96
235	4.284E+13	1.8246	4.0701	.31	1.95
236	4.303E+13	1.8273	4.0719	.30	1.94
237	4.321E+13	1.8300	4.0736	.30	1.93
238	4.339E+13	1.8327	4.0754	.30	1.92
239	4.357E+13	1.8354	4.0772	.30	1.91
240	4.375E+13	1.8381	4.0789	.30	1.91
241	4.394E+13	1.8409	4.0807	.30	1.90
242	4.412E+13	1.8437	4.0825	.30	1.89
243	4.430E+13	1.8464	4.0843	.29	1.88
244	4.449E+13	1.8492	4.0861	.29	1.87
245	4.467E+13	1.8521	4.0879	.29	1.86
246	4.485E+13	1.8549	4.0897	.29	1.85
247	4.503E+13	1.8578	4.0915	.29	1.84
248	4.521E+13	1.8606	4.0933	.29	1.83
249	4.539E+13	1.8635	4.0951	.29	1.82

TABLE B-2

PRE-MAIN-SEQUENCE BINARY TEST MODEL FOR THE SECONDARY

MASS = 1.5 $M_{\odot}$

PERIOD = 3 DAYS

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	ROQUE EP	2/25/51
1	1.460E+08	4.1532	3.3449	.00	4.50
2	2.224E+08	4.1343	3.3465	.00	4.56
3	3.016E+08	4.1153	3.3481	.03	4.54
4	3.847E+08	4.0964	3.3498	.03	4.52
5	4.720E+08	4.0774	3.3514	.07	4.49
6	5.637E+08	4.0585	3.3530	.07	4.47
7	6.590E+08	4.0396	3.3547	.06	4.45
8	7.600E+08	4.0206	3.3563	.06	4.43
9	8.660E+08	4.0017	3.3579	.05	4.41
10	9.782E+08	3.9827	3.3596	.05	4.38
11	1.095E+09	3.9638	3.3612	.04	4.36
12	1.218E+09	3.9449	3.3628	.04	4.34
13	1.347E+09	3.9259	3.3645	.03	4.32
14	1.482E+09	3.9070	3.3661	.03	4.30
15	1.624E+09	3.8880	3.3677	.02	4.28
16	1.773E+09	3.8691	3.3694	.02	4.25
17	1.929E+09	3.8502	3.3710	.01	4.23
18	2.094E+09	3.8312	3.3726	.01	4.21
19	2.266E+09	3.8123	3.3743	.00	4.19
20	2.447E+09	3.7933	3.3759	.00	4.17
21	2.637E+09	3.7744	3.3775	.00	4.15
22	2.837E+09	3.7555	3.3792	.00	4.13
23	3.046E+09	3.7365	3.3808	.00	4.11
24	3.266E+09	3.7176	3.3824	.00	4.09
25	3.497E+09	3.6986	3.3841	.00	4.07
26	3.739E+09	3.6797	3.3857	.07	4.05
27	3.994E+09	3.6608	3.3873	.07	4.03
28	4.261E+09	3.6418	3.3890	.06	4.01
29	4.541E+09	3.6229	3.3906	.06	3.99
30	4.835E+09	3.6039	3.3922	.06	3.97
31	5.145E+09	3.5850	3.3939	.05	3.95
32	5.469E+09	3.5661	3.3955	.05	3.93
33	5.810E+09	3.5471	3.3971	.04	3.91
34	6.167E+09	3.5282	3.3988	.04	3.89
35	6.543E+09	3.5092	3.4004	.03	3.87
36	6.937E+09	3.4903	3.4020	.03	3.85
37	7.350E+09	3.4714	3.4037	.03	3.83
38	7.785E+09	3.4524	3.4053	.02	3.81
39	8.241E+09	3.4335	3.4069	.02	3.79
40	8.720E+09	3.4145	3.4086	.01	3.77
41	9.222E+09	3.3956	3.4102	.01	3.75
42	9.750E+09	3.3767	3.4118	.01	3.73
43	1.030E+10	3.3577	3.4134	.00	3.71
44	1.099E+10	3.3388	3.4151	.00	3.70
45	1.150E+10	3.3198	3.4167	.00	3.68
46	1.214E+10	3.3009	3.4183	.00	3.66
47	1.281E+10	3.2820	3.4200	.00	3.64
48	1.352E+10	3.2630	3.4216	.00	3.62
49	1.426E+10	3.2441	3.4232	.00	3.61

MODEL	TIME	LOG(L/L/SUN)	LOG(TEFF)	POUCH 50	2/2/SUN
50	1.504E+10	3.2251	3.4240	.77	3.50
51	1.585E+10	3.2362	3.4265	.77	3.57
52	1.671E+10	3.1373	3.4281	.77	3.55
53	1.761E+10	3.1682	3.4299	.76	3.52
54	1.856E+10	3.1404	3.4314	.76	3.52
55	1.955E+10	3.1304	3.4330	.76	3.50
56	2.059E+10	3.1115	3.4347	.75	3.48
57	2.169E+10	3.0226	3.4363	.75	3.46
58	2.284E+10	3.0736	3.4370	.74	3.45
59	2.404E+10	3.0547	3.4306	.74	3.43
60	2.531E+10	3.0357	3.4412	.74	3.41
61	2.664E+10	3.0168	3.4428	.73	3.39
62	2.803E+10	3.0278	3.4445	.73	3.38
63	2.950E+10	2.9780	3.4461	.73	3.36
64	3.103E+10	2.9600	3.4477	.72	3.34
65	3.265E+10	2.9410	3.4494	.72	3.33
66	3.434E+10	2.9221	3.4510	.71	3.31
67	3.612E+10	2.9031	3.4526	.71	3.29
68	3.799E+10	2.8842	3.4542	.71	3.28
69	3.995E+10	2.8653	3.4559	.70	3.26
70	4.201E+10	2.8463	3.4575	.70	3.25
71	4.417E+10	2.8274	3.4592	.70	3.23
72	4.644E+10	2.8084	3.4608	.69	3.21
73	4.882E+10	2.7895	3.4624	.69	3.20
74	5.132E+10	2.7706	3.4641	.69	3.18
75	5.395E+10	2.7516	3.4657	.68	3.16
76	5.671E+10	2.7327	3.4673	.68	3.15
77	5.960E+10	2.7137	3.4690	.68	3.13
78	6.264E+10	2.6948	3.4706	.67	3.12
79	6.583E+10	2.6759	3.4722	.67	3.10
80	6.918E+10	2.6569	3.4739	.67	3.09
81	7.269E+10	2.6380	3.4755	.66	3.07
82	7.638E+10	2.6190	3.4771	.66	3.06
83	8.025E+10	2.6001	3.4788	.66	3.04
84	8.432E+10	2.5811	3.4804	.65	3.03
85	8.859E+10	2.5622	3.4820	.65	3.01
86	9.307E+10	2.5433	3.4837	.65	2.99
87	9.779E+10	2.5243	3.4853	.64	2.98
88	1.027E+11	2.5054	3.4869	.64	2.97
89	1.079E+11	2.4864	3.4886	.64	2.95
90	1.134E+11	2.4675	3.4902	.63	2.94
91	1.191E+11	2.4485	3.4918	.63	2.92
92	1.251E+11	2.4296	3.4935	.62	2.91
93	1.314E+11	2.4107	3.4951	.62	2.90
94	1.380E+11	2.3917	3.4967	.62	2.88
95	1.449E+11	2.3728	3.4983	.62	2.86
96	1.522E+11	2.3538	3.5000	.61	2.85
97	1.599E+11	2.3349	3.5016	.61	2.83
98	1.679E+11	2.3160	3.5032	.61	2.82
99	1.763E+11	2.2970	3.5049	.61	2.81

MODEL	TIME	LOG(L/LSHN)	LOG(TEFF)	POURCE 52	R/RSHN
100	1.252E+11	2.2791	3.5065	.60	2.70
101	1.245E+11	2.2501	3.5082	.60	2.72
102	2.242E+11	2.2402	3.5009	.60	2.76
103	2.145E+11	2.2212	3.5114	.59	2.75
104	2.252E+11	2.2022	3.5131	.59	2.74
105	2.365E+11	2.1834	3.5147	.59	2.72
106	2.484E+11	2.1644	3.5162	.58	2.71
107	2.600E+11	2.1455	3.5180	.58	2.70
108	2.730E+11	2.1265	3.5196	.58	2.68
109	2.876E+11	2.1076	3.5212	.58	2.67
110	3.020E+11	2.0886	3.5229	.57	2.66
111	3.171E+11	2.0697	3.5245	.57	2.64
112	3.330E+11	2.0507	3.5261	.57	2.63
113	3.497E+11	2.0319	3.5278	.56	2.62
114	3.672E+11	2.0129	3.5294	.56	2.60
115	3.855E+11	1.9939	3.5310	.56	2.59
116	4.048E+11	1.9750	3.5327	.56	2.57
117	4.251E+11	1.9560	3.5343	.55	2.56
118	4.463E+11	1.9371	3.5359	.55	2.55
119	4.686E+11	1.9181	3.5376	.55	2.54
120	4.920E+11	1.8992	3.5392	.55	2.52
121	5.166E+11	1.8802	3.5409	.54	2.51
122	5.424E+11	1.8612	3.5425	.54	2.50
123	5.695E+11	1.8424	3.5441	.54	2.49
124	5.980E+11	1.8234	3.5457	.53	2.48
125	6.270E+11	1.8045	3.5474	.53	2.46
126	6.592E+11	1.7855	3.5490	.53	2.45
127	6.921E+11	1.7666	3.5506	.53	2.44
128	7.267E+11	1.7476	3.5522	.52	2.43
129	7.630E+11	1.7287	3.5539	.52	2.41
130	8.011E+11	1.7097	3.5555	.52	2.40
131	8.410E+11	1.6908	3.5572	.52	2.39
132	8.830E+11	1.6718	3.5589	.51	2.38
133	9.271E+11	1.6529	3.5604	.51	2.37
134	9.734E+11	1.6339	3.5621	.51	2.35
135	1.022E+12	1.6150	3.5637	.51	2.34
136	1.073E+12	1.5960	3.5653	.50	2.33
137	1.127E+12	1.5771	3.5670	.50	2.32
138	1.183E+12	1.5581	3.5686	.50	2.31
139	1.242E+12	1.5392	3.5702	.50	2.30
140	1.304E+12	1.5202	3.5719	.49	2.28
141	1.369E+12	1.5013	3.5735	.49	2.27
142	1.437E+12	1.4823	3.5751	.49	2.26
143	1.509E+12	1.4634	3.5768	.49	2.25
144	1.584E+12	1.4444	3.5784	.49	2.24
145	1.663E+12	1.4255	3.5800	.49	2.23
146	1.746E+12	1.4065	3.5817	.49	2.22
147	1.832E+12	1.3876	3.5833	.49	2.21
148	1.924E+12	1.3686	3.5849	.47	2.19
149	2.020E+12	1.3497	3.5866	.47	2.18

MODEL	TIME	LOG(L/L/SUN)	LOG(TEMP)	ROCHE 52	2/25/81
150	2.121E+12	1.3307	3.5882	.47	2.17
151	2.227E+12	1.3118	3.5808	.47	2.16
152	2.338E+12	1.2928	3.5915	.46	2.15
153	2.455E+12	1.2730	3.5931	.46	2.14
154	2.577E+12	1.2540	3.5947	.46	2.13
155	2.706E+12	1.2360	3.5964	.46	2.12
156	2.841E+12	1.2170	3.5980	.46	2.11
157	2.982E+12	1.1980	3.5996	.45	2.10
158	3.131E+12	1.1791	3.6013	.45	2.09
159	3.287E+12	1.1601	3.6029	.45	2.08
160	3.451E+12	1.1412	3.6045	.45	2.07
161	3.623E+12	1.1222	3.6062	.44	2.06
162	3.804E+12	1.1033	3.6078	.44	2.05
163	3.994E+12	1.0843	3.6094	.44	2.04
164	4.193E+12	1.0653	3.6111	.44	2.03
165	4.402E+12	1.0464	3.6127	.44	2.02
166	4.621E+12	1.0274	3.6143	.43	2.01
167	4.852E+12	1.0084	3.6160	.43	2.00
168	5.094E+12	.9895	3.6176	.43	1.99
169	5.348E+12	.9705	3.6192	.42	1.98
170	5.615E+12	.9516	3.6209	.42	1.97
171	5.895E+12	.9326	3.6225	.42	1.96
172	6.189E+12	.9136	3.6241	.42	1.95
173	6.497E+12	.8947	3.6258	.42	1.94
174	6.821E+12	.8757	3.6274	.42	1.93
175	7.162E+12	.8567	3.6291	.41	1.92
176	7.519E+12	.8378	3.6307	.41	1.91
177	7.894E+12	.8188	3.6323	.41	1.90
178	8.288E+12	.7998	3.6340	.41	1.89
179	8.701E+12	.7808	3.6356	.41	1.89
180	9.135E+12	.7619	3.6372	.40	1.87
181	9.591E+12	.7429	3.6389	.40	1.86
182	1.007E+13	.7239	3.6405	.40	1.85
183	1.057E+13	.7049	3.6421	.40	1.84
184	1.110E+13	.6860	3.6438	.40	1.83
185	1.165E+13	.6670	3.6454	.39	1.82
186	1.223E+13	.6480	3.6470	.39	1.81
187	1.284E+13	.6290	3.6487	.39	1.81
188	1.441E+13	.6025	3.6503	.39	1.80
189	1.597E+13	.6747	3.6520	.39	1.79
190	1.753E+13	.6768	3.6536	.38	1.78
191	1.910E+13	.6790	3.6552	.38	1.77
192	2.065E+13	.6812	3.6568	.38	1.76
193	2.227E+13	.6834	3.6585	.38	1.75
194	2.379E+13	.6856	3.6601	.37	1.74
195	2.535E+13	.6878	3.6617	.37	1.73
196	2.691E+13	.6900	3.6634	.37	1.73
197	2.848E+13	.6922	3.6650	.37	1.72
198	3.004E+13	.6944	3.6667	.37	1.71
199	3.160E+13	.6966	3.6683	.37	1.70

MODEL	TIME	LOG(L/LSUN)	LOG(TEMP)	ROCHEL EP	2/2SUN
200	3.317E+13	.1088	3.6700	.37	1.60
201	3.472E+13	.1010	3.6716	.36	1.60
202	3.620E+13	.1032	3.6732	.36	1.60
203	3.784E+13	.1054	3.6740	.36	1.60
204	3.942E+13	.1076	3.6765	.36	1.66
205	4.098E+13	.1098	3.6792	.36	1.65
206	4.255E+13	.1120	3.6798	.35	1.64
207	4.411E+13	.1142	3.6814	.35	1.63
208	4.567E+13	.1164	3.6831	.35	1.62
209	4.724E+13	.1186	3.6847	.35	1.62
210	4.880E+13	.1208	3.6864	.35	1.61
211	5.036E+13	.1230	3.6880	.35	1.60
212	5.193E+13	.1252	3.6896	.34	1.59
213	5.349E+13	.1274	3.6913	.34	1.58
214	5.505E+13	.1296	3.6929	.34	1.59
215	5.662E+13	.1318	3.6946	.34	1.57
216	5.818E+13	.1341	3.6962	.34	1.56
217	5.974E+13	.1363	3.6978	.34	1.55
218	6.131E+13	.1385	3.6995	.33	1.55
219	6.287E+13	.1407	3.7011	.33	1.54
220	6.443E+13	.1429	3.7028	.33	1.53
221	6.600E+13	.1451	3.7044	.33	1.52
222	6.756E+13	.1474	3.7060	.33	1.51
223	6.912E+13	.1496	3.7077	.33	1.51
224	7.069E+13	.1518	3.7093	.32	1.50
225	7.225E+13	.1540	3.7110	.32	1.49
226	7.381E+13	.1562	3.7126	.32	1.48
227	7.538E+13	.1585	3.7143	.32	1.48
228	7.694E+13	.1607	3.7159	.32	1.47
229	7.850E+13	.1629	3.7176	.32	1.46
230	8.007E+13	.1651	3.7192	.31	1.46
231	8.163E+13	.1674	3.7208	.31	1.45
232	8.319E+13	.1696	3.7225	.31	1.44
233	8.476E+13	.1718	3.7241	.31	1.43
234	8.632E+13	.1741	3.7258	.31	1.43
235	8.788E+13	.1763	3.7274	.31	1.42
236	8.945E+13	.1785	3.7291	.30	1.41
237	9.101E+13	.1808	3.7307	.30	1.40
238	9.257E+13	.1830	3.7324	.30	1.40
239	9.413E+13	.1853	3.7340	.30	1.39
240	9.570E+13	.1875	3.7357	.30	1.38
241	9.726E+13	.1898	3.7373	.30	1.38
242	9.882E+13	.1920	3.7390	.30	1.37
243	1.004E+14	.1943	3.7406	.29	1.36
244	1.020E+14	.1965	3.7422	.29	1.36
245	1.035E+14	.1988	3.7439	.29	1.35
246	1.051E+14	.2010	3.7456	.29	1.34
247	1.066E+14	.2033	3.7472	.29	1.34
248	1.082E+14	.2056	3.7489	.29	1.33
249	1.098E+14	.2078	3.7506	.29	1.32

APPENDIX C

TABLE C-1

PRE-MAIN-SEQUENCE BINARY MODEL FOR TV CASSIOPEIA

PRIMARY MASS = $3.10 M_{\odot}$

PERIOD = 1.243 DAYS

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	PAUSE	DDDSUM
1	1.647E+11	1.5081	3.8047	.02	4.61
2	3.204E+11	1.5102	3.8064	.02	4.53
3	4.742E+11	1.5125	3.8080	.03	4.56
4	6.590E+11	1.5146	3.8096	.03	4.54
5	8.236E+11	1.5169	3.8113	.07	4.51
6	9.883E+11	1.5190	3.8129	.07	4.49
7	1.153E+12	1.5212	3.8145	.06	4.47
8	1.318E+12	1.5234	3.8162	.06	4.45
9	1.482E+12	1.5255	3.8178	.05	4.42
10	1.647E+12	1.5277	3.8194	.05	4.40
11	1.812E+12	1.5299	3.8211	.04	4.38
12	1.977E+12	1.5321	3.8227	.04	4.36
13	2.141E+12	1.5343	3.8243	.03	4.34
14	2.306E+12	1.5364	3.8260	.03	4.32
15	2.471E+12	1.5386	3.8276	.02	4.29
16	2.636E+12	1.5408	3.8292	.02	4.27
17	2.800E+12	1.5430	3.8309	.01	4.25
18	2.965E+12	1.5452	3.8325	.01	4.23
19	3.130E+12	1.5474	3.8341	.00	4.21
20	3.294E+12	1.5495	3.8358	.00	4.19
21	3.459E+12	1.5517	3.8374	.00	4.17
22	3.624E+12	1.5539	3.8391	.00	4.15
23	3.789E+12	1.5561	3.8407	.00	4.12
24	3.953E+12	1.5583	3.8423	.03	4.10
25	4.118E+12	1.5605	3.8440	.03	4.08
26	4.283E+12	1.5626	3.8456	.07	4.06
27	4.447E+12	1.5648	3.8472	.07	4.04
28	4.612E+12	1.5670	3.8489	.06	4.02
29	4.777E+12	1.5692	3.8505	.06	4.00
30	4.942E+12	1.5714	3.8521	.06	3.98
31	5.106E+12	1.5736	3.8538	.05	3.96
32	5.271E+12	1.5758	3.8554	.05	3.94
33	5.436E+12	1.5779	3.8570	.04	3.92
34	5.600E+12	1.5801	3.8587	.04	3.90
35	5.765E+12	1.5823	3.8603	.03	3.88
36	5.930E+12	1.5845	3.8619	.03	3.86
37	6.095E+12	1.5867	3.8636	.03	3.85
38	6.259E+12	1.5889	3.8652	.02	3.83
39	6.424E+12	1.5911	3.8669	.02	3.81
40	6.589E+12	1.5932	3.8685	.01	3.79
41	6.753E+12	1.5954	3.8701	.01	3.77
42	6.918E+12	1.5976	3.8717	.01	3.75
43	7.083E+12	1.5998	3.8734	.00	3.73
44	7.247E+12	1.6020	3.8750	.00	3.71
45	7.412E+12	1.6042	3.8767	.70	3.69
46	7.577E+12	1.6064	3.8783	.70	3.68
47	7.742E+12	1.6086	3.8799	.70	3.66
48	7.906E+12	1.6108	3.8816	.70	3.64
49	8.071E+12	1.6129	3.8832	.73	3.62

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	ROCHE GR	D/PSUN
50	9.234E+12	1.6151	3.3849	.77	3.60
51	9.400E+12	1.6173	3.3865	.77	3.59
52	9.565E+12	1.6195	3.3881	.77	3.57
53	9.730E+12	1.6217	3.3897	.76	3.55
54	9.895E+12	1.6239	3.3914	.76	3.53
55	9.059E+12	1.6261	3.3930	.76	3.51
56	9.224E+12	1.6283	3.3947	.75	3.50
57	9.389E+12	1.6305	3.3963	.75	3.48
58	9.553E+12	1.6327	3.3979	.74	3.46
59	9.718E+12	1.6349	3.3996	.74	3.44
60	9.883E+12	1.6371	3.4012	.74	3.43
61	1.005E+13	1.6393	3.4029	.73	3.41
62	1.021E+13	1.6415	3.4045	.73	3.39
63	1.038E+13	1.6437	3.4061	.73	3.38
64	1.054E+13	1.6459	3.4078	.72	3.36
65	1.071E+13	1.6481	3.4094	.72	3.34
66	1.087E+13	1.6503	3.4110	.71	3.33
67	1.104E+13	1.6525	3.4127	.71	3.31
68	1.120E+13	1.6547	3.4143	.71	3.29
69	1.137E+13	1.6569	3.4159	.70	3.28
70	1.153E+13	1.6591	3.4176	.70	3.26
71	1.169E+13	1.6613	3.4192	.70	3.24
72	1.186E+13	1.6635	3.4209	.69	3.23
73	1.202E+13	1.6657	3.4225	.69	3.21
74	1.219E+13	1.6679	3.4241	.69	3.19
75	1.235E+13	1.6701	3.4258	.68	3.18
76	1.252E+13	1.6723	3.4274	.68	3.16
77	1.268E+13	1.6745	3.4291	.68	3.15
78	1.285E+13	1.6767	3.4307	.67	3.13
79	1.301E+13	1.6789	3.4323	.67	3.12
80	1.318E+13	1.6811	3.4340	.67	3.10
81	1.334E+13	1.6833	3.4356	.66	3.08
82	1.351E+13	1.6855	3.4373	.66	3.07
83	1.367E+13	1.6877	3.4389	.66	3.05
84	1.384E+13	1.6900	3.4405	.65	3.04
85	1.400E+13	1.6922	3.4422	.65	3.02
86	1.417E+13	1.6944	3.4438	.65	3.01
87	1.433E+13	1.6966	3.4455	.64	2.99
88	1.449E+13	1.6988	3.4471	.64	2.98
89	1.466E+13	1.7010	3.4488	.64	2.96
90	1.482E+13	1.7033	3.4504	.63	2.95
91	1.499E+13	1.7055	3.4521	.63	2.93
92	1.515E+13	1.7077	3.4537	.63	2.92
93	1.532E+13	1.7099	3.4553	.62	2.90
94	1.548E+13	1.7122	3.4570	.62	2.90
95	1.565E+13	1.7144	3.4586	.62	2.88
96	1.581E+13	1.7166	3.4603	.61	2.86
97	1.598E+13	1.7189	3.4619	.61	2.85
98	1.614E+13	1.7211	3.4636	.61	2.83
99	1.631E+13	1.7233	3.4652	.61	2.82

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE	DOSE/CM
100	1.647E+13	1.7256	3.0660	.60	2.30
101	1.664E+13	1.7279	3.0625	.60	2.70
102	1.680E+13	1.7300	3.0702	.60	2.72
103	1.696E+13	1.7323	3.0713	.50	2.76
104	1.713E+13	1.7345	3.0735	.50	2.75
105	1.729E+13	1.7368	3.0751	.50	2.73
106	1.746E+13	1.7390	3.0768	.58	2.72
107	1.762E+13	1.7413	3.0784	.58	2.71
108	1.779E+13	1.7435	3.0791	.58	2.69
109	1.795E+13	1.7458	3.0817	.50	2.69
110	1.812E+13	1.7480	3.0834	.57	2.67
111	1.828E+13	1.7503	3.0850	.57	2.65
112	1.845E+13	1.7526	3.0867	.57	2.64
113	1.861E+13	1.7548	3.0883	.56	2.63
114	1.878E+13	1.7571	3.0900	.56	2.61
115	1.894E+13	1.7594	3.0916	.56	2.60
116	1.911E+13	1.7616	3.0933	.56	2.59
117	1.927E+13	1.7639	3.0950	.55	2.58
118	1.944E+13	1.7662	3.0966	.55	2.56
119	1.960E+13	1.7685	3.0982	.55	2.55
120	1.976E+13	1.7707	3.0999	.55	2.54
121	1.993E+13	1.7730	4.0016	.54	2.52
122	2.009E+13	1.7753	4.0033	.54	2.51
123	2.026E+13	1.7776	4.0049	.54	2.50
124	2.042E+13	1.7799	4.0066	.53	2.49
125	2.059E+13	1.7822	4.0082	.53	2.47
126	2.075E+13	1.7845	4.0099	.53	2.46
127	2.092E+13	1.7868	4.0116	.53	2.45
128	2.108E+13	1.7891	4.0132	.52	2.44
129	2.125E+13	1.7915	4.0149	.52	2.42
130	2.141E+13	1.7938	4.0166	.52	2.41
131	2.158E+13	1.7961	4.0182	.52	2.40
132	2.174E+13	1.7984	4.0199	.51	2.39
133	2.191E+13	1.8008	4.0216	.51	2.38
134	2.207E+13	1.8031	4.0233	.51	2.36
135	2.223E+13	1.8055	4.0249	.51	2.35
136	2.240E+13	1.8078	4.0266	.50	2.34
137	2.256E+13	1.8102	4.0283	.50	2.33
138	2.273E+13	1.8125	4.0300	.50	2.32
139	2.289E+13	1.8149	4.0316	.50	2.31
140	2.306E+13	1.8173	4.0333	.49	2.29
141	2.322E+13	1.8196	4.0350	.49	2.28
142	2.339E+13	1.8220	4.0367	.49	2.27
143	2.355E+13	1.8244	4.0384	.49	2.26
144	2.372E+13	1.8268	4.0401	.48	2.25
145	2.388E+13	1.8292	4.0417	.48	2.24
146	2.405E+13	1.8316	4.0434	.48	2.23
147	2.421E+13	1.8340	4.0451	.48	2.22
148	2.438E+13	1.8365	4.0468	.47	2.20
149	2.454E+13	1.8389	4.0485	.47	2.19

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE	ED	2/25/84
150	2.471E+13	1.8413	4.0502	.47		2.19
151	2.487E+13	1.8439	4.0510	.47		2.17
152	2.503E+13	1.8462	4.0536	.46		2.16
153	2.520E+13	1.8487	4.0553	.46		2.15
154	2.536E+13	1.8512	4.0570	.46		2.14
155	2.553E+13	1.8536	4.0587	.46		2.13
156	2.569E+13	1.8561	4.0605	.46		2.12
157	2.586E+13	1.8586	4.0622	.45		2.11
158	2.602E+13	1.8611	4.0630	.45		2.10
159	2.619E+13	1.8636	4.0656	.45		2.09
160	2.635E+13	1.8662	4.0673	.45		2.08
161	2.652E+13	1.8687	4.0690	.44		2.07
162	2.668E+13	1.8713	4.0708	.44		2.06
163	2.685E+13	1.8738	4.0725	.44		2.04
164	2.701E+13	1.8764	4.0742	.44		2.03
165	2.718E+13	1.8790	4.0760	.44		2.02
166	2.734E+13	1.8816	4.0777	.43		2.01
167	2.750E+13	1.8842	4.0794	.43		2.00
168	2.767E+13	1.8868	4.0812	.43		1.99
169	2.783E+13	1.8894	4.0829	.43		1.99
170	2.800E+13	1.8921	4.0847	.42		1.97
171	2.816E+13	1.8947	4.0864	.42		1.96
172	2.833E+13	1.8974	4.0882	.42		1.95
173	2.849E+13	1.9001	4.0900	.42		1.94
174	2.866E+13	1.9028	4.0917	.42		1.94
175	2.882E+13	1.9055	4.0935	.41		1.93
176	2.899E+13	1.9082	4.0953	.41		1.92
177	2.915E+13	1.9110	4.0970	.41		1.91
178	2.932E+13	1.9137	4.0988	.41		1.90
179	2.948E+13	1.9165	4.1006	.41		1.90
180	2.965E+13	1.9193	4.1024	.40		1.89
181	2.981E+13	1.9221	4.1042	.40		1.87
182	2.997E+13	1.9250	4.1060	.40		1.86
183	3.014E+13	1.9278	4.1078	.40		1.85
184	3.030E+13	1.9307	4.1096	.40		1.84
185	3.047E+13	1.9336	4.1114	.39		1.83
186	3.063E+13	1.9365	4.1132	.39		1.82
187	3.080E+13	1.9395	4.1150	.39		1.81
188	3.096E+13	1.9424	4.1169	.39		1.80
189	3.113E+13	1.9454	4.1187	.39		1.79
190	3.129E+13	1.9484	4.1205	.38		1.79
191	3.146E+13	1.9514	4.1224	.38		1.78
192	3.162E+13	1.9545	4.1242	.38		1.77
193	3.179E+13	1.9576	4.1261	.38		1.76
194	3.195E+13	1.9607	4.1280	.37		1.75
195	3.212E+13	1.9638	4.1298	.37		1.74
196	3.229E+13	1.9670	4.1317	.37		1.73
197	3.246E+13	1.9702	4.1336	.37		1.72
198	3.261E+13	1.9734	4.1355	.37		1.72
199	3.277E+13	1.9766	4.1374	.37		1.71

MODEL	TIME	LOG(L/LSUN)	LOG(TEMP)	DOSE 50	24PSIN
200	3.204E+13	1.0700	4.1303	.37	1.70
201	3.310E+13	1.0832	4.1412	.36	1.69
202	3.327E+13	1.0865	4.1431	.36	1.68
203	3.343E+13	1.0890	4.1451	.36	1.67
204	3.360E+13	1.0922	4.1470	.36	1.66
205	3.376E+13	1.0967	4.1489	.36	1.66
206	3.393E+13	2.0902	4.1500	.35	1.65
207	3.409E+13	2.0937	4.1520	.35	1.64
208	3.426E+13	2.0972	4.1548	.35	1.63
209	3.442E+13	2.0108	4.1568	.35	1.62
210	3.459E+13	2.0144	4.1588	.35	1.62
211	3.475E+13	2.0181	4.1608	.35	1.61
212	3.491E+13	2.0217	4.1628	.34	1.60
213	3.508E+13	2.0255	4.1648	.34	1.59
214	3.524E+13	2.0293	4.1669	.34	1.58
215	3.541E+13	2.0331	4.1689	.34	1.57
216	3.557E+13	2.0369	4.1710	.34	1.57
217	3.574E+13	2.0408	4.1730	.34	1.56
218	3.590E+13	2.0448	4.1751	.33	1.55
219	3.607E+13	2.0488	4.1772	.33	1.54
220	3.623E+13	2.0528	4.1793	.33	1.54
221	3.640E+13	2.0569	4.1814	.33	1.53
222	3.656E+13	2.0611	4.1835	.33	1.52
223	3.673E+13	2.0653	4.1857	.33	1.51
224	3.689E+13	2.0695	4.1878	.32	1.51
225	3.706E+13	2.0738	4.1900	.32	1.50
226	3.722E+13	2.0782	4.1922	.32	1.49
227	3.738E+13	2.0826	4.1943	.32	1.48
228	3.755E+13	2.0870	4.1966	.32	1.48
229	3.771E+13	2.0916	4.1989	.32	1.47
230	3.788E+13	2.0961	4.2010	.31	1.46
231	3.804E+13	2.1009	4.2033	.31	1.45
232	3.821E+13	2.1055	4.2055	.31	1.45
233	3.837E+13	2.1102	4.2078	.31	1.44
234	3.854E+13	2.1151	4.2101	.31	1.43
235	3.870E+13	2.1199	4.2124	.31	1.43
236	3.887E+13	2.1249	4.2147	.30	1.42
237	3.903E+13	2.1299	4.2171	.30	1.41
238	3.920E+13	2.1350	4.2194	.30	1.40
239	3.936E+13	2.1402	4.2218	.30	1.40
240	3.953E+13	2.1454	4.2242	.30	1.39
241	3.969E+13	2.1507	4.2266	.30	1.38
242	3.985E+13	2.1561	4.2290	.30	1.38
243	4.002E+13	2.1615	4.2315	.29	1.37
244	4.018E+13	2.1670	4.2340	.29	1.36
245	4.035E+13	2.1726	4.2364	.29	1.36
246	4.051E+13	2.1783	4.2390	.29	1.35
247	4.068E+13	2.1840	4.2415	.29	1.34
248	4.084E+13	2.1898	4.2440	.29	1.34
249	4.101E+13	2.1957	4.2466	.29	1.33

TABLE C-2

PRE-MAIN-SEQUENCE BINARY MODEL FOR TV CASSIOPEIA

SECONDARY MASS = 1.39 $M_{\odot}$

PERIOD = 1.243 DAYS

MODEL	TIME	LOG(L/L _{SUN})	LOG(TEMP)	DENSITY	2/DENSITY
1	2.126E+00	2.0355	3.1221	.00	2.12
2	2.218E+00	2.0665	3.1237	.00	2.16
3	4.365E+00	2.0476	3.4254	.02	2.15
4	5.560E+00	2.0287	3.4270	.02	2.12
5	6.323E+00	2.0007	3.4286	.07	2.12
6	8.160E+00	2.0008	3.4302	.07	2.10
7	0.553E+00	2.0718	3.4310	.06	2.08
8	1.102E+10	2.0520	3.4335	.06	2.07
9	1.255E+10	2.0330	3.4352	.05	2.05
10	1.416E+10	2.0150	3.4368	.05	2.04
11	1.536E+10	2.0261	3.4384	.04	2.02
12	1.763E+10	2.8771	3.4401	.04	2.01
13	1.950E+10	2.9582	3.4417	.03	2.00
14	2.146E+10	2.9302	3.4433	.03	2.08
15	2.351E+10	2.8203	3.4450	.02	2.06
16	2.567E+10	2.8014	3.4466	.02	2.05
17	2.793E+10	2.7326	3.4482	.01	2.03
18	3.031E+10	2.7635	3.4498	.01	2.02
19	3.281E+10	2.7445	3.4515	.00	2.00
20	3.543E+10	2.7256	3.4531	.00	2.80
21	3.818E+10	2.7066	3.4547	.00	2.88
22	4.107E+10	2.6877	3.4564	.80	2.86
23	4.411E+10	2.6688	3.4580	.80	2.95
24	4.720E+10	2.6498	3.4596	.83	2.92
25	5.063E+10	2.6309	3.4613	.83	2.92
26	5.414E+10	2.6110	3.4629	.87	2.90
27	5.783E+10	2.5920	3.4645	.87	2.70
28	6.169E+10	2.5741	3.4662	.86	2.78
29	6.576E+10	2.5551	3.4678	.86	2.76
30	7.002E+10	2.5362	3.4694	.86	2.75
31	7.440E+10	2.5172	3.4711	.85	2.72
32	7.910E+10	2.4983	3.4727	.85	2.72
33	8.413E+10	2.4793	3.4743	.84	2.71
34	8.930E+10	2.4604	3.4760	.84	2.60
35	9.474E+10	2.4414	3.4776	.83	2.68
36	1.004E+11	2.4225	3.4792	.83	2.67
37	1.064E+11	2.4036	3.4809	.83	2.65
38	1.127E+11	2.3846	3.4825	.82	2.64
39	1.193E+11	2.3657	3.4841	.82	2.63
40	1.263E+11	2.3467	3.4858	.81	2.61
41	1.335E+11	2.3278	3.4874	.81	2.60
42	1.412E+11	2.3088	3.4890	.81	2.50
43	1.492E+11	2.2899	3.4907	.80	2.58
44	1.576E+11	2.2710	3.4923	.80	2.56
45	1.665E+11	2.2520	3.4939	.79	2.55
46	1.758E+11	2.2331	3.4956	.78	2.54
47	1.858E+11	2.2141	3.4972	.78	2.52
48	1.957E+11	2.1952	3.4989	.77	2.51
49	2.065E+11	2.1762	3.5005	.78	2.50

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	ROCHE FR	PARSH
50	2.177E+11	2.1572	3.5021	.77	2.42
51	2.206E+11	2.1383	3.5037	.77	2.47
52	2.420E+11	2.1124	3.5054	.77	2.46
53	2.551E+11	2.1004	3.5070	.76	2.45
54	2.688E+11	2.0815	3.5086	.76	2.44
55	2.831E+11	2.0626	3.5103	.76	2.42
56	2.982E+11	2.0436	3.5119	.75	2.41
57	3.141E+11	2.0247	3.5135	.75	2.40
58	3.307E+11	2.0057	3.5152	.74	2.39
59	3.482E+11	1.9869	3.5168	.74	2.38
60	3.665E+11	1.9679	3.5184	.74	2.36
61	3.958E+11	1.9490	3.5201	.73	2.35
62	4.060E+11	1.9299	3.5217	.73	2.34
63	4.272E+11	1.9110	3.5233	.73	2.33
64	4.495E+11	1.8920	3.5250	.72	2.32
65	4.720E+11	1.8731	3.5266	.72	2.31
66	4.974E+11	1.8541	3.5282	.71	2.29
67	5.232E+11	1.8352	3.5299	.71	2.28
68	5.503E+11	1.8162	3.5315	.71	2.27
69	5.787E+11	1.7973	3.5331	.70	2.26
70	6.085E+11	1.7782	3.5348	.70	2.25
71	6.398E+11	1.7594	3.5364	.70	2.24
72	6.727E+11	1.7404	3.5380	.69	2.23
73	7.072E+11	1.7215	3.5397	.69	2.22
74	7.435E+11	1.7025	3.5413	.69	2.20
75	7.815E+11	1.6836	3.5430	.69	2.19
76	8.214E+11	1.6646	3.5446	.69	2.18
77	8.634E+11	1.6457	3.5462	.68	2.17
78	9.074E+11	1.6267	3.5478	.67	2.16
79	9.536E+11	1.6078	3.5495	.67	2.15
80	1.002E+12	1.5888	3.5511	.67	2.14
81	1.053E+12	1.5699	3.5527	.66	2.13
82	1.107E+12	1.5509	3.5544	.66	2.12
83	1.163E+12	1.5320	3.5560	.66	2.11
84	1.222E+12	1.5130	3.5576	.65	2.10
85	1.284E+12	1.4940	3.5593	.65	2.09
86	1.348E+12	1.4751	3.5609	.65	2.08
87	1.417E+12	1.4561	3.5626	.64	2.07
88	1.489E+12	1.4372	3.5642	.64	2.06
89	1.563E+12	1.4182	3.5658	.64	2.04
90	1.642E+12	1.3993	3.5675	.63	2.03
91	1.725E+12	1.3803	3.5691	.63	2.02
92	1.812E+12	1.3613	3.5707	.63	2.01
93	1.904E+12	1.3424	3.5724	.62	2.00
94	1.999E+12	1.3234	3.5740	.62	1.99
95	2.100E+12	1.3045	3.5756	.62	1.99
96	2.206E+12	1.2855	3.5773	.61	1.97
97	2.317E+12	1.2665	3.5789	.61	1.96
98	2.433E+12	1.2476	3.5805	.61	1.95
99	2.556E+12	1.2286	3.5822	.61	1.94

MODEL	TIME	LOG(L/L _{SUN})	LOG(TEMP)	DOSE	ED	D/MSUN
100	2.684E+12	1.2006	3.5838	.60		1.04
101	2.810E+12	1.1997	3.5854	.60		1.03
102	2.960E+12	1.1717	3.5871	.60		1.02
103	3.102E+12	1.1527	3.5887	.50		1.01
104	3.265E+12	1.1338	3.5903	.50		1.00
105	3.420E+12	1.1148	3.5920	.50		1.30
106	3.601E+12	1.0958	3.5936	.58		1.83
107	3.781E+12	1.0769	3.5952	.58		1.37
108	3.971E+12	1.0579	3.5969	.58		1.86
109	4.170E+12	1.0389	3.5985	.58		1.85
110	4.370E+12	1.0199	3.6002	.57		1.84
111	4.598E+12	1.0010	3.6018	.57		1.83
112	4.820E+12	.9820	3.6034	.57		1.82
113	5.071E+12	.9630	3.6051	.56		1.81
114	5.324E+12	.9440	3.6067	.56		1.80
115	5.591E+12	.9251	3.6083	.56		1.80
116	5.871E+12	.9061	3.6100	.56		1.79
117	6.165E+12	.8871	3.6116	.55		1.78
118	6.473E+12	.8681	3.6132	.55		1.77
119	6.797E+12	.8491	3.6149	.55		1.76
120	7.137E+12	.8302	3.6165	.55		1.75
121	7.495E+12	.8112	3.6182	.54		1.74
122	7.870E+12	.7922	3.6198	.54		1.73
123	8.263E+12	.7732	3.6214	.54		1.72
124	8.677E+12	.7542	3.6231	.53		1.72
125	9.110E+12	.7352	3.6247	.53		1.71
126	9.566E+12	.7162	3.6263	.53		1.70
127	1.004E+13	.6972	3.6280	.53		1.69
128	1.055E+13	.6782	3.6296	.52		1.68
129	1.107E+13	.6592	3.6313	.52		1.67
130	1.163E+13	.6402	3.6329	.52		1.67
131	1.221E+13	.6212	3.6345	.52		1.66
132	1.282E+13	.6022	3.6362	.51		1.65
133	1.346E+13	.5832	3.6378	.51		1.64
134	1.413E+13	.5642	3.6394	.51		1.63
135	1.484E+13	.5452	3.6411	.51		1.62
136	1.558E+13	.5262	3.6427	.50		1.62
137	1.636E+13	.5071	3.6444	.50		1.61
138	1.718E+13	.4881	3.6460	.50		1.60
139	1.804E+13	.4691	3.6476	.50		1.59
140	1.894E+13	.4501	3.6493	.49		1.58
141	2.002E+13	-.0389	3.6509	.49		1.58
142	2.200E+13	-.0367	3.6526	.49		1.57
143	2.489E+13	-.0344	3.6542	.49		1.56
144	2.686E+13	-.0322	3.6559	.48		1.55
145	2.984E+13	-.0300	3.6575	.48		1.54
146	3.082E+13	-.0278	3.6591	.48		1.54
147	3.280E+13	-.0256	3.6608	.48		1.53
148	3.478E+13	-.0234	3.6624	.47		1.52
149	3.676E+13	-.0212	3.6640	.47		1.51

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	ROCHELOR	D/D SUN
150	3.374E+13	-.0190	3.6657	.47	1.51
151	4.072E+13	-.0167	3.6673	.47	1.50
152	4.270E+13	-.0145	3.6690	.46	1.49
153	4.468E+13	-.0123	3.6706	.46	1.48
154	4.666E+13	-.0101	3.6723	.46	1.48
155	4.864E+13	-.0079	3.6739	.46	1.47
156	5.062E+13	-.0056	3.6756	.46	1.46
157	5.260E+13	-.0034	3.6772	.45	1.45
158	5.458E+13	-.0012	3.6788	.45	1.45
159	5.656E+13	.0010	3.6805	.45	1.44
160	5.853E+13	.0033	3.6821	.45	1.43
161	6.051E+13	.0055	3.6838	.44	1.43
162	6.249E+13	.0077	3.6854	.44	1.42
163	6.447E+13	.0100	3.6871	.44	1.41
164	6.645E+13	.0122	3.6887	.44	1.40
165	6.843E+13	.0144	3.6904	.44	1.40
166	7.041E+13	.0167	3.6920	.43	1.39
167	7.239E+13	.0189	3.6937	.43	1.38
168	7.437E+13	.0212	3.6953	.43	1.38
169	7.635E+13	.0234	3.6970	.43	1.37
170	7.833E+13	.0257	3.6986	.42	1.36
171	8.031E+13	.0279	3.7003	.42	1.36
172	8.229E+13	.0302	3.7019	.42	1.35
173	8.427E+13	.0324	3.7036	.42	1.34
174	8.625E+13	.0347	3.7052	.42	1.34
175	8.823E+13	.0369	3.7069	.41	1.33
176	9.021E+13	.0392	3.7085	.41	1.32
177	9.219E+13	.0415	3.7102	.41	1.32
178	9.417E+13	.0437	3.7118	.41	1.31
179	9.615E+13	.0460	3.7135	.41	1.30
180	9.813E+13	.0483	3.7152	.40	1.30
181	1.001E+14	.0505	3.7168	.40	1.29
182	1.021E+14	.0528	3.7185	.40	1.28
183	1.041E+14	.0551	3.7201	.40	1.28
184	1.060E+14	.0574	3.7218	.40	1.27
185	1.080E+14	.0597	3.7234	.39	1.26
186	1.100E+14	.0620	3.7251	.39	1.26
187	1.120E+14	.0643	3.7268	.39	1.25
188	1.140E+14	.0666	3.7284	.39	1.24
189	1.159E+14	.0689	3.7301	.39	1.24
190	1.179E+14	.0712	3.7318	.38	1.23
191	1.199E+14	.0735	3.7334	.38	1.23
192	1.219E+14	.0758	3.7351	.38	1.22
193	1.239E+14	.0781	3.7368	.38	1.21
194	1.258E+14	.0804	3.7384	.38	1.21
195	1.278E+14	.0827	3.7401	.37	1.20
196	1.298E+14	.0851	3.7418	.37	1.20
197	1.318E+14	.0874	3.7434	.37	1.19
198	1.338E+14	.0897	3.7451	.37	1.18
199	1.357E+14	.0921	3.7468	.37	1.18

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	ROCHE FR	2 ADSUN
200	1.377E+14	.0244	3.7485	.37	1.17
201	1.397E+14	.0269	3.7501	.36	1.17
202	1.417E+14	.0292	3.7518	.36	1.16
203	1.437E+14	.1015	3.7535	.36	1.15
204	1.456E+14	.1030	3.7552	.36	1.15
205	1.476E+14	.1063	3.7560	.36	1.14
206	1.496E+14	.1097	3.7585	.35	1.14
207	1.516E+14	.1110	3.7602	.35	1.13
208	1.536E+14	.1134	3.7610	.35	1.13
209	1.555E+14	.1158	3.7636	.35	1.12
210	1.575E+14	.1182	3.7653	.35	1.11
211	1.595E+14	.1207	3.7670	.35	1.11
212	1.615E+14	.1231	3.7687	.34	1.10
213	1.635E+14	.1255	3.7704	.34	1.10
214	1.654E+14	.1280	3.7721	.34	1.09
215	1.674E+14	.1304	3.7738	.34	1.09
216	1.694E+14	.1328	3.7755	.34	1.08
217	1.714E+14	.1353	3.7772	.34	1.08
218	1.734E+14	.1378	3.7789	.33	1.07
219	1.753E+14	.1403	3.7806	.33	1.07
220	1.773E+14	.1427	3.7823	.33	1.06
221	1.793E+14	.1452	3.7840	.33	1.06
222	1.813E+14	.1478	3.7857	.33	1.05
223	1.833E+14	.1503	3.7875	.33	1.04
224	1.852E+14	.1528	3.7892	.32	1.04
225	1.872E+14	.1553	3.7909	.32	1.03
226	1.892E+14	.1579	3.7926	.32	1.03
227	1.912E+14	.1604	3.7944	.32	1.02
228	1.931E+14	.1630	3.7961	.32	1.02
229	1.951E+14	.1656	3.7978	.32	1.01
230	1.971E+14	.1682	3.7996	.31	1.01
231	1.991E+14	.1708	3.8013	.31	1.00
232	2.011E+14	.1734	3.8030	.31	1.00
233	2.030E+14	.1760	3.8048	.31	.09
234	2.050E+14	.1787	3.8065	.31	.09
235	2.070E+14	.1813	3.8083	.31	.08
236	2.090E+14	.1840	3.8100	.30	.08
237	2.110E+14	.1867	3.8118	.30	.07
238	2.129E+14	.1894	3.8136	.30	.07
239	2.149E+14	.1921	3.8153	.30	.06
240	2.169E+14	.1949	3.8171	.30	.06
241	2.189E+14	.1976	3.8189	.30	.05
242	2.209E+14	.2004	3.8207	.30	.05
243	2.228E+14	.2032	3.8224	.29	.04
244	2.248E+14	.2060	3.8242	.29	.04
245	2.268E+14	.2088	3.8260	.29	.04
246	2.288E+14	.2116	3.8278	.29	.03
247	2.308E+14	.2145	3.8296	.29	.03
248	2.327E+14	.2173	3.8314	.29	.02
249	2.347E+14	.2202	3.8332	.29	.02

TABLE C-3

PRE-MAIN-SEQUENCE BINARY MODEL FOR IM AURIGAE

PRIMARY MASS = 2.91 $M_{\odot}$

PERIOD = 1.247 DAYS

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE NO	Q/ZOOM
1	1.981E+11	1.5112	2.9542	.00	2.62
2	3.762E+11	1.5134	2.9560	.02	2.66
3	5.643E+11	1.5155	2.9576	.02	2.64
4	7.525E+11	1.5177	2.9593	.02	2.62
5	9.406E+11	1.5199	2.9609	.07	2.61
6	1.129E+12	1.5221	2.9625	.07	2.59
7	1.317E+12	1.5243	2.9642	.06	2.57
8	1.505E+12	1.5265	2.9659	.06	2.55
9	1.693E+12	1.5287	2.9674	.05	2.53
10	1.981E+12	1.5309	2.9691	.05	2.52
11	2.069E+12	1.5331	2.9707	.04	2.50
12	2.257E+12	1.5353	2.9723	.04	2.48
13	2.445E+12	1.5375	2.9740	.03	2.46
14	2.634E+12	1.5397	2.9756	.03	2.45
15	2.922E+12	1.5419	2.9773	.02	2.43
16	3.010E+12	1.5440	2.9789	.02	2.41
17	3.198E+12	1.5462	2.9805	.01	2.39
18	3.386E+12	1.5484	2.9822	.01	2.39
19	3.574E+12	1.5506	2.9838	.00	2.36
20	3.762E+12	1.5529	2.9854	.00	2.34
21	3.950E+12	1.5550	2.9871	.00	2.33
22	4.138E+12	1.5572	2.9887	.00	2.31
23	4.327E+12	1.5594	2.9904	.00	2.29
24	4.515E+12	1.5616	2.9920	.00	2.27
25	4.703E+12	1.5638	2.9936	.00	2.26
26	4.891E+12	1.5660	2.9953	.07	2.24
27	5.079E+12	1.5682	2.9969	.07	2.22
28	5.267E+12	1.5704	2.9986	.06	2.21
29	5.455E+12	1.5726	2.9992	.06	2.20
30	5.643E+12	1.5748	2.9998	.06	2.18
31	5.831E+12	1.5770	2.99935	.05	2.16
32	6.020E+12	1.5792	2.9951	.05	2.15
33	6.208E+12	1.5815	2.9968	.04	2.13
34	6.396E+12	1.5837	2.9984	.04	2.12
35	6.584E+12	1.5859	2.9990	.03	2.10
36	6.772E+12	1.5881	2.9997	.03	2.09
37	6.960E+12	1.5903	2.9993	.03	2.07
38	7.148E+12	1.5925	2.9950	.02	2.06
39	7.336E+12	1.5947	2.9966	.02	2.04
40	7.524E+12	1.5969	2.9982	.01	2.02
41	7.713E+12	1.5991	2.9999	.01	2.01
42	7.901E+12	1.6013	2.9995	.01	2.00
43	8.089E+12	1.6036	2.9992	.00	2.00
44	8.277E+12	1.6058	2.9948	.00	2.06
45	8.465E+12	1.6080	2.9965	.00	2.05
46	8.653E+12	1.6102	2.9981	.00	2.04
47	8.841E+12	1.6125	2.9997	.00	2.02
48	9.029E+12	1.6147	2.9993	.00	2.01
49	9.217E+12	1.6169	2.9990	.00	2.00

MODEL	TIME	LOG(L/LSUN)	LOG(TEMP)	POUNE 50	POUNE 50
50	0.405E+12	1.6191	3.0347	.77	2.88
51	0.504E+12	1.6214	3.0363	.77	2.86
52	0.782E+12	1.6236	3.0330	.77	2.85
53	0.070E+12	1.6258	3.0306	.76	2.83
54	1.016E+13	1.6290	3.0413	.76	2.82
55	1.035E+13	1.6303	3.0420	.76	2.81
56	1.053E+13	1.6325	3.0446	.75	2.77
57	1.072E+13	1.6348	3.0462	.75	2.77
58	1.091E+13	1.6370	3.0478	.74	2.76
59	1.110E+13	1.6392	3.0495	.74	2.75
60	1.120E+13	1.6415	3.0511	.74	2.74
61	1.147E+13	1.6437	3.0529	.73	2.72
62	1.166E+13	1.6460	3.0544	.73	2.71
63	1.185E+13	1.6482	3.0561	.73	2.70
64	1.204E+13	1.6505	3.0577	.72	2.68
65	1.223E+13	1.6527	3.0594	.72	2.67
66	1.242E+13	1.6550	3.0611	.71	2.66
67	1.260E+13	1.6572	3.0627	.71	2.64
68	1.279E+13	1.6595	3.0644	.71	2.63
69	1.298E+13	1.6618	3.0660	.70	2.62
70	1.317E+13	1.6640	3.0677	.70	2.60
71	1.336E+13	1.6663	3.0693	.70	2.59
72	1.354E+13	1.6686	3.0710	.69	2.58
73	1.373E+13	1.6708	3.0726	.69	2.56
74	1.392E+13	1.6731	3.0743	.69	2.55
75	1.411E+13	1.6754	3.0760	.68	2.54
76	1.430E+13	1.6777	3.0776	.68	2.53
77	1.449E+13	1.6800	3.0793	.68	2.51
78	1.467E+13	1.6823	3.0809	.67	2.50
79	1.486E+13	1.6846	3.0826	.67	2.49
80	1.505E+13	1.6868	3.0843	.67	2.48
81	1.524E+13	1.6891	3.0859	.66	2.46
82	1.542E+13	1.6915	3.0876	.66	2.45
83	1.561E+13	1.6938	3.0893	.66	2.44
84	1.580E+13	1.6961	3.0909	.65	2.43
85	1.599E+13	1.6984	3.0926	.65	2.41
86	1.618E+13	1.7007	3.0943	.65	2.40
87	1.637E+13	1.7030	3.0959	.64	2.39
88	1.655E+13	1.7054	3.0976	.64	2.38
89	1.674E+13	1.7077	3.0993	.64	2.37
90	1.693E+13	1.7100	4.0009	.63	2.35
91	1.712E+13	1.7124	4.0026	.63	2.34
92	1.731E+13	1.7147	4.0043	.63	2.33
93	1.749E+13	1.7171	4.0060	.62	2.32
94	1.768E+13	1.7194	4.0076	.62	2.31
95	1.787E+13	1.7218	4.0093	.61	2.30
96	1.806E+13	1.7242	4.0110	.61	2.28
97	1.825E+13	1.7265	4.0127	.61	2.27
98	1.843E+13	1.7289	4.0144	.61	2.26
99	1.862E+13	1.7313	4.0161	.61	2.25

MODE	TIME	LOG(L/USIN)	LOG(T/EE)	POWERS	PARSIN
100	1.891E+13	1.7327	4.0177	.60	2.24
101	1.900E+13	1.7361	4.0194	.60	2.23
102	1.910E+13	1.7395	4.0211	.60	2.22
103	1.927E+13	1.7400	4.0229	.59	2.21
104	1.956E+13	1.7422	4.0245	.59	2.19
105	1.975E+13	1.7459	4.0262	.59	2.19
106	1.994E+13	1.7492	4.0279	.58	2.17
107	2.013E+13	1.7506	4.0296	.58	2.16
108	2.031E+13	1.7531	4.0313	.58	2.15
109	2.050E+13	1.7555	4.0330	.58	2.14
110	2.069E+13	1.7590	4.0347	.57	2.13
111	2.088E+13	1.7605	4.0364	.57	2.12
112	2.107E+13	1.7630	4.0381	.57	2.11
113	2.126E+13	1.7655	4.0398	.56	2.10
114	2.144E+13	1.7680	4.0415	.56	2.09
115	2.163E+13	1.7705	4.0433	.56	2.08
116	2.182E+13	1.7730	4.0450	.56	2.07
117	2.201E+13	1.7755	4.0467	.55	2.06
118	2.220E+13	1.7781	4.0484	.55	2.05
119	2.239E+13	1.7806	4.0502	.55	2.04
120	2.257E+13	1.7832	4.0519	.55	2.03
121	2.276E+13	1.7858	4.0536	.54	2.02
122	2.295E+13	1.7894	4.0554	.54	2.01
123	2.314E+13	1.7919	4.0571	.54	2.00
124	2.332E+13	1.7936	4.0589	.53	1.99
125	2.351E+13	1.7962	4.0606	.53	1.98
126	2.370E+13	1.7988	4.0623	.53	1.97
127	2.389E+13	1.8015	4.0641	.53	1.96
128	2.408E+13	1.8042	4.0658	.52	1.95
129	2.426E+13	1.8068	4.0676	.52	1.94
130	2.445E+13	1.8095	4.0694	.52	1.93
131	2.464E+13	1.8123	4.0711	.52	1.92
132	2.483E+13	1.8150	4.0729	.51	1.91
133	2.502E+13	1.8177	4.0747	.51	1.90
134	2.520E+13	1.8205	4.0764	.51	1.89
135	2.539E+13	1.8233	4.0782	.51	1.88
136	2.558E+13	1.8260	4.0800	.50	1.87
137	2.577E+13	1.8289	4.0818	.50	1.86
138	2.596E+13	1.8317	4.0836	.50	1.85
139	2.615E+13	1.8345	4.0854	.50	1.84
140	2.633E+13	1.8374	4.0872	.49	1.83
141	2.652E+13	1.8403	4.0890	.49	1.82
142	2.671E+13	1.8432	4.0909	.49	1.81
143	2.690E+13	1.8461	4.0927	.49	1.81
144	2.709E+13	1.8491	4.0945	.49	1.80
145	2.727E+13	1.8521	4.0963	.49	1.79
146	2.746E+13	1.8551	4.0981	.49	1.78
147	2.765E+13	1.8581	4.1000	.48	1.77
148	2.784E+13	1.8611	4.1019	.47	1.76
149	2.803E+13	1.8642	4.1037	.47	1.75

MODEL	TIME	LOG(L/ALUM)	LOG(TFEE)	POURCE FD	2/25SUM
150	2.821E+13	1.8673	4.1056	.47	1.74
151	2.840E+13	1.8704	4.1074	.47	1.73
152	2.850E+13	1.8735	4.1093	.46	1.73
153	2.878E+13	1.8767	4.1112	.46	1.72
154	2.907E+13	1.8799	4.1131	.46	1.71
155	2.915E+13	1.8831	4.1150	.46	1.70
156	2.934E+13	1.8864	4.1169	.46	1.69
157	2.953E+13	1.8897	4.1188	.45	1.68
158	2.972E+13	1.8930	4.1207	.45	1.67
159	2.991E+13	1.8964	4.1226	.45	1.67
160	3.009E+13	1.8998	4.1246	.45	1.66
161	3.028E+13	1.9032	4.1265	.44	1.65
162	3.047E+13	1.9066	4.1285	.44	1.64
163	3.066E+13	1.9101	4.1304	.44	1.63
164	3.085E+13	1.9136	4.1324	.44	1.62
165	3.104E+13	1.9172	4.1344	.44	1.62
166	3.122E+13	1.9208	4.1364	.43	1.61
167	3.141E+13	1.9244	4.1383	.43	1.60
168	3.160E+13	1.9281	4.1404	.43	1.59
169	3.179E+13	1.9319	4.1424	.43	1.58
170	3.198E+13	1.9356	4.1444	.42	1.58
171	3.216E+13	1.9394	4.1464	.42	1.57
172	3.235E+13	1.9432	4.1485	.42	1.56
173	3.254E+13	1.9471	4.1506	.42	1.55
174	3.273E+13	1.9510	4.1526	.42	1.55
175	3.292E+13	1.9550	4.1547	.41	1.54
176	3.310E+13	1.9590	4.1568	.41	1.53
177	3.329E+13	1.9631	4.1589	.41	1.52
178	3.348E+13	1.9672	4.1610	.41	1.51
179	3.367E+13	1.9714	4.1632	.41	1.51
180	3.386E+13	1.9756	4.1653	.40	1.50
181	3.404E+13	1.9799	4.1675	.40	1.49
182	3.423E+13	1.9842	4.1696	.40	1.49
183	3.442E+13	1.9886	4.1719	.40	1.48
184	3.461E+13	1.9931	4.1740	.40	1.47
185	3.480E+13	1.9976	4.1762	.39	1.46
186	3.498E+13	2.0021	4.1785	.39	1.46
187	3.517E+13	2.0067	4.1807	.39	1.45
188	3.536E+13	2.0114	4.1830	.39	1.44
189	3.555E+13	2.0161	4.1852	.39	1.43
190	3.574E+13	2.0209	4.1875	.38	1.43
191	3.592E+13	2.0258	4.1898	.38	1.42
192	3.611E+13	2.0307	4.1921	.38	1.41
193	3.630E+13	2.0357	4.1945	.38	1.40
194	3.649E+13	2.0406	4.1968	.38	1.40
195	3.668E+13	2.0456	4.1992	.37	1.39
196	3.687E+13	2.0511	4.2016	.37	1.38
197	3.706E+13	2.0564	4.2040	.37	1.38
198	3.724E+13	2.0617	4.2064	.37	1.37
199	3.743E+13	2.0672	4.2089	.37	1.36

MODE	TIME	LOG(M/SEC)	LOG(TEMP)	DOUGH EP	2/25 IN
200	2.762E+13	2.0726	4.2113	.37	1.36
201	2.781E+13	2.0782	4.2132	.36	1.35
202	2.792E+13	2.0838	4.2163	.36	1.34
203	2.818E+13	2.0895	4.2192	.36	1.34
204	2.837E+13	2.0953	4.2213	.36	1.33
205	2.856E+13	2.1012	4.2232	.36	1.32
206	2.875E+13	2.1071	4.2265	.35	1.32
207	2.893E+13	2.1132	4.2291	.35	1.31
208	2.912E+13	2.1193	4.2317	.35	1.30
209	2.931E+13	2.1255	4.2343	.35	1.30
210	.000E+00	2.1318	4.2370	.00	.00
211	.000E+00	.0000	.0000	.00	.00
212	.000E+00	.0000	.0000	.00	.00
213	.000E+00	.0000	.0000	.00	.00
214	.000E+00	.0000	.0000	.00	.00
215	.000E+00	.0000	.0000	.00	.00
216	.000E+00	.0000	.0000	.00	.00
217	.000E+00	.0000	.0000	.00	.00
218	.000E+00	.0000	.0000	.00	.00
219	.000E+00	.0000	.0000	.00	.00
220	.000E+00	.0000	.0000	.00	.00
221	.000E+00	.0000	.0000	.00	.00
222	.000E+00	.0000	.0000	.00	.00
223	.000E+00	.0000	.0000	.00	.00
224	.000E+00	.0000	.0000	.00	.00
225	.000E+00	.0000	.0000	.00	.00
226	.000E+00	.0000	.0000	.00	.00
227	.000E+00	.0000	.0000	.00	.00
228	.000E+00	.0000	.0000	.00	.00
229	.000E+00	.0000	.0000	.00	.00
230	.000E+00	.0000	.0000	.00	.00
231	.000E+00	.0000	.0000	.00	.00
232	.000E+00	.0000	.0000	.00	.00
233	.000E+00	.0000	.0000	.00	.00
234	.000E+00	.0000	.0000	.00	.00
235	.000E+00	.0000	.0000	.00	.00
236	.000E+00	.0000	.0000	.00	.00
237	.000E+00	.0000	.0000	.00	.00
238	.000E+00	.0000	.0000	.00	.00
239	.000E+00	.0000	.0000	.00	.00
240	.000E+00	.0000	.0000	.00	.00
241	.000E+00	.0000	.0000	.00	.00
242	.000E+00	.0000	.0000	.00	.00
243	.000E+00	.0000	.0000	.00	.00
244	.000E+00	.0000	.0000	.00	.00
245	.000E+00	.0000	.0000	.00	.00
246	.000E+00	.0000	.0000	.00	.00
247	.000E+00	.0000	.0000	.00	.00
248	.000E+00	.0000	.0000	.00	.00
249	.000E+00	.0000	.0000	.00	.00

TABLE C-4

PRE-MAIN-SEQUENCE BINARY MODEL FOR IM AURIGAE

SECONDARY MASS = 0.89 $M_{\odot}$

PERIOD = 1.247 DAYS

MODEL	TIME	LOG(L/L _{SUN})	LOG(TEFF)	POUNE	SD	D/D _{SUN}
1	7.102E+03	3.3567	3.3110	.00		2.00
2	1.075E+02	3.2378	3.3135	.00		2.00
3	1.458E+02	3.3188	3.3152	.00		2.07
4	1.860E+02	3.2000	3.3168	.09		2.06
5	2.282E+02	3.2300	3.3184	.07		2.05
6	2.726E+02	3.2620	3.3201	.07		2.04
7	3.191E+02	3.2430	3.3217	.06		2.03
8	3.670E+02	3.2241	3.3233	.06		2.02
9	4.102E+02	3.2051	3.3250	.05		2.01
10	4.731E+02	3.1862	3.3266	.05		2.00
11	5.296E+02	3.1672	3.3282	.04		1.99
12	5.800E+02	3.1483	3.3299	.04		1.98
13	6.513E+02	3.1293	3.3315	.03		1.97
14	7.167E+02	3.1103	3.3331	.03		1.96
15	7.854E+02	3.0914	3.3348	.02		1.95
16	8.575E+02	3.0724	3.3364	.02		1.94
17	9.331E+02	3.0535	3.3381	.01		1.93
18	1.013E+10	3.0345	3.3397	.01		1.92
19	1.096E+10	3.0156	3.3412	.00		1.91
20	1.184E+10	2.9966	3.3430	.00		1.90
21	1.276E+10	2.9777	3.3446	.00		1.89
22	1.372E+10	2.9587	3.3462	.80		1.88
23	1.474E+10	2.9397	3.3479	.80		1.87
24	1.580E+10	2.9208	3.3495	.88		1.86
25	1.692E+10	2.9018	3.3511	.89		1.85
26	1.809E+10	2.8828	3.3528	.87		1.84
27	1.932E+10	2.8638	3.3544	.87		1.83
28	2.061E+10	2.8449	3.3560	.86		1.82
29	2.197E+10	2.8260	3.3577	.86		1.80
30	2.340E+10	2.8070	3.3593	.86		1.81
31	2.489E+10	2.7880	3.3609	.85		1.80
32	2.646E+10	2.7691	3.3626	.85		1.79
33	2.811E+10	2.7501	3.3642	.84		1.78
34	2.984E+10	2.7311	3.3658	.84		1.77
35	3.166E+10	2.7122	3.3675	.83		1.76
36	3.357E+10	2.6932	3.3691	.83		1.75
37	3.557E+10	2.6742	3.3707	.83		1.74
38	3.768E+10	2.6552	3.3724	.82		1.74
39	3.989E+10	2.6362	3.3740	.82		1.73
40	4.221E+10	2.6173	3.3757	.81		1.72
41	4.464E+10	2.5983	3.3773	.81		1.71
42	4.720E+10	2.5793	3.3789	.81		1.70
43	4.988E+10	2.5604	3.3806	.80		1.69
44	5.270E+10	2.5414	3.3822	.80		1.68
45	5.566E+10	2.5224	3.3838	.79		1.69
46	5.876E+10	2.5034	3.3855	.79		1.67
47	6.203E+10	2.4845	3.3871	.79		1.66
48	6.545E+10	2.4655	3.3887	.78		1.65
49	6.904E+10	2.4465	3.3904	.78		1.64

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	ROCHE	ED	D/R SUN
50	7.292E+10	2.4275	3.3020	.77		1.62
51	7.472E+10	2.4085	3.3037	.77		1.62
52	3.704E+10	2.3205	3.3053	.77		1.62
53	8.531E+10	2.3705	3.3060	.76		1.61
54	3.000E+10	2.3515	3.3086	.76		1.60
55	0.472E+10	2.3325	3.4002	.76		1.50
56	0.277E+10	2.3136	3.4013	.75		1.50
57	1.051E+11	2.2246	3.4035	.75		1.52
58	1.107E+11	2.2756	3.4051	.74		1.57
59	1.165E+11	2.2566	3.4063	.74		1.56
60	1.227E+11	2.2376	3.4084	.74		1.55
61	1.291E+11	2.2186	3.4100	.73		1.55
62	1.350E+11	2.1996	3.4117	.73		1.54
63	1.430E+11	2.1805	3.4133	.73		1.53
64	1.505E+11	2.1615	3.4140	.72		1.52
65	1.583E+11	2.1425	3.4166	.72		1.52
66	1.665E+11	2.1235	3.4182	.71		1.51
67	1.752E+11	2.1045	3.4199	.71		1.50
68	1.843E+11	2.0855	3.4215	.71		1.49
69	1.938E+11	2.0665	3.4231	.70		1.49
70	2.038E+11	2.0474	3.4248	.70		1.48
71	2.143E+11	2.0284	3.4264	.70		1.47
72	2.254E+11	2.0094	3.4281	.69		1.46
73	2.370E+11	1.9903	3.4297	.69		1.46
74	2.491E+11	1.9713	3.4313	.69		1.45
75	2.610E+11	1.9523	3.4330	.68		1.44
76	2.753E+11	1.9332	3.4346	.68		1.43
77	2.824E+11	1.9142	3.4363	.68		1.43
78	3.042E+11	1.8951	3.4379	.67		1.42
79	3.197E+11	1.8761	3.4396	.67		1.41
80	3.361E+11	1.8570	3.4412	.67		1.41
81	3.532E+11	1.8380	3.4428	.66		1.40
82	3.712E+11	1.8189	3.4445	.66		1.39
83	3.901E+11	1.7999	3.4461	.66		1.39
84	4.099E+11	1.7808	3.4473	.65		1.38
85	4.308E+11	1.7617	3.4494	.65		1.37
86	4.526E+11	1.7426	3.4511	.65		1.36
87	4.756E+11	1.7236	3.4527	.64		1.36
88	4.997E+11	1.7045	3.4543	.64		1.35
89	5.251E+11	1.6854	3.4560	.64		1.34
90	5.517E+11	1.6663	3.4576	.63		1.34
91	5.796E+11	1.6472	3.4593	.63		1.33
92	6.090E+11	1.6281	3.4609	.63		1.32
93	6.399E+11	1.6090	3.4626	.62		1.32
94	6.722E+11	1.5900	3.4642	.62		1.31
95	7.062E+11	1.5709	3.4659	.62		1.30
96	7.419E+11	1.5516	3.4675	.61		1.30
97	7.794E+11	1.5325	3.4692	.61		1.29
98	8.182E+11	1.5134	3.4708	.61		1.28
99	8.602E+11	1.4942	3.4725	.61		1.28

MODEL	TIME	LOG(L/L _{SUN})	LOG(TEMP)	POUNE 5D	POUNES
100	0.034E+11	1.4751	3.4741	.60	1.27
101	0.403E+11	1.4550	3.4759	.60	1.27
102	0.072E+11	1.4369	3.4774	.60	1.26
103	1.049E+12	1.4176	3.4791	.50	1.25
104	1.100E+12	1.3985	3.4807	.50	1.25
105	1.156E+12	1.3793	3.4824	.50	1.24
106	1.214E+12	1.3601	3.4840	.58	1.23
107	1.276E+12	1.3409	3.4857	.58	1.23
108	1.340E+12	1.3217	3.4873	.58	1.22
109	1.408E+12	1.3025	3.4890	.58	1.22
110	1.479E+12	1.2833	3.4907	.57	1.21
111	1.553E+12	1.2640	3.4923	.57	1.20
112	1.632E+12	1.2449	3.4940	.57	1.20
113	1.714E+12	1.2256	3.4956	.56	1.19
114	1.801E+12	1.2063	3.4973	.56	1.19
115	1.892E+12	1.1870	3.4990	.56	1.18
116	1.987E+12	1.1679	3.5006	.56	1.17
117	2.089E+12	1.1485	3.5023	.55	1.17
118	2.193E+12	1.1292	3.5039	.55	1.16
119	2.304E+12	1.1099	3.5056	.55	1.16
120	2.420E+12	1.0906	3.5073	.55	1.15
121	2.543E+12	1.0713	3.5089	.54	1.14
122	2.671E+12	1.0519	3.5106	.54	1.14
123	2.806E+12	1.0326	3.5123	.54	1.13
124	2.948E+12	1.0132	3.5139	.53	1.13
125	3.097E+12	.9939	3.5156	.53	1.12
126	3.254E+12	.9744	3.5173	.53	1.12
127	3.419E+12	.9550	3.5190	.53	1.11
128	3.592E+12	.9356	3.5206	.52	1.11
129	3.774E+12	.9162	3.5223	.52	1.10
130	3.965E+12	.8969	3.5240	.52	1.09
131	4.166E+12	.8773	3.5257	.52	1.09
132	4.377E+12	.8578	3.5273	.51	1.08
133	4.599E+12	.8383	3.5290	.51	1.08
134	4.833E+12	.8189	3.5307	.51	1.07
135	5.079E+12	.7993	3.5324	.51	1.07
136	5.336E+12	.7799	3.5341	.50	1.06
137	5.607E+12	.7602	3.5357	.50	1.06
138	5.892E+12	.7406	3.5374	.50	1.05
139	6.192E+12	.7210	3.5391	.50	1.05
140	6.507E+12	.7014	3.5409	.49	1.04
141	6.839E+12	.6819	3.5425	.49	1.04
142	7.187E+12	.6621	3.5442	.49	1.03
143	7.554E+12	.6424	3.5459	.49	1.03
144	7.939E+12	.6227	3.5476	.48	1.02
145	8.344E+12	.6030	3.5493	.48	1.02
146	8.771E+12	.5832	3.5510	.48	1.01
147	9.219E+12	.5635	3.5527	.48	1.01
148	9.691E+12	.5437	3.5544	.47	1.00
149	1.019E+13	.5239	3.5561	.47	1.00

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE	ED	DOSE	ED
150	1.071E+13	.5040	3.5579	.47		.00	
151	1.124E+13	.4341	3.5505	.47		.00	
152	1.184E+13	.4642	3.5612	.46		.00	
153	1.244E+13	.4442	3.5630	.46		.00	
154	1.308E+13	.4243	3.5647	.46		.07	
155	1.376E+13	.4043	3.5664	.46		.07	
156	1.446E+13	.3843	3.5682	.46		.06	
157	1.521E+13	.3642	3.5699	.45		.06	
158	1.600E+13	.3441	3.5716	.45		.05	
159	1.682E+13	.3240	3.5733	.45		.05	
160	1.769E+13	.3039	3.5751	.45		.04	
161	1.861E+13	.2837	3.5768	.44		.04	
162	1.957E+13	.2634	3.5786	.44		.03	
163	2.059E+13	.2432	3.5803	.44		.03	
164	2.166E+13	.2229	3.5821	.44		.02	
165	2.278E+13	.2025	3.5838	.44		.02	
166	2.397E+13	.1821	3.5856	.43		.01	
167	2.522E+13	.1617	3.5873	.43		.01	
168	2.653E+13	.1412	3.5891	.43		.00	
169	2.792E+13	.1207	3.5909	.43		.00	
170	2.938E+13	.1001	3.5927	.42		.00	
171	3.092E+13	.0795	3.5944	.42		.00	
172	3.254E+13	.0588	3.5962	.42		.00	
173	3.425E+13	.0381	3.5980	.42		.00	
174	3.606E+13	.0173	3.5997	.42		.00	
175	3.796E+13	-.0035	3.6016	.41		.00	
176	3.996E+13	-.0244	3.6034	.41		.00	
177	4.208E+13	-.0453	3.6052	.41		.00	
178	4.431E+13	-.0663	3.6070	.41		.00	
179	4.666E+13	-.0873	3.6088	.41		.00	
180	4.914E+13	-.1084	3.6106	.40		.00	
181	5.176E+13	-.1296	3.6125	.40		.00	
182	5.452E+13	-.1508	3.6143	.40		.00	
183	5.744E+13	-.1721	3.6161	.40		.00	
184	6.052E+13	-.1935	3.6180	.40		.00	
185	6.377E+13	-.2149	3.6198	.39		.00	
186	6.720E+13	-.2365	3.6217	.39		.00	
187	7.082E+13	-.2580	3.6235	.39		.00	
188	7.465E+13	-.2797	3.6254	.39		.00	
189	7.870E+13	-.3014	3.6273	.39		.00	
190	8.297E+13	-.3232	3.6291	.38		.00	
191	8.749E+13	-.3451	3.6310	.38		.00	
192	9.227E+13	-.3671	3.6329	.38		.00	
193	9.732E+13	-.3892	3.6348	.38		.00	
194	1.027E+14	-.4113	3.6367	.37		.00	
195	1.083E+14	-.4336	3.6387	.37		.00	
196	1.143E+14	-.4559	3.6406	.37		.00	
197	1.206E+14	-.4783	3.6425	.37		.00	
198	1.273E+14	-.5008	3.6445	.37		.00	
199	1.344E+14	-.5234	3.6464	.37		.00	

MODEL	TIME	LOG(L/LSUN)	LOG(TEMP)	DOSE 50	DOSE 100
200	1.410E+14	-5462	3.6484	.37	.77
201	1.408E+14	-5460	3.6502	.36	.77
202	1.577E+14	-5433	3.6523	.36	.76
203	1.655E+14	-5507	3.6543	.36	.76
204	1.724E+14	-5561	3.6563	.36	.76
205	1.813E+14	-5524	3.6582	.36	.75
206	1.892E+14	-5487	3.6603	.35	.75
207	1.971E+14	-5450	3.6622	.35	.74
208	2.050E+14	-5412	3.6644	.35	.74
209	2.129E+14	-5373	3.6664	.35	.74
210	.000E+00	.0000	.0000	.00	.00
211	.000E+00	.0000	.0000	.00	.00
212	.000E+00	.0000	.0000	.00	.00
213	.000E+00	.0000	.0000	.00	.00
214	.000E+00	.0000	.0000	.00	.00
215	.000E+00	.0000	.0000	.00	.00
216	.000E+00	.0000	.0000	.00	.00
217	.000E+00	.0000	.0000	.00	.00
218	.000E+00	.0000	.0000	.00	.00
219	.000E+00	.0000	.0000	.00	.00
220	.000E+00	.0000	.0000	.00	.00
221	.000E+00	.0000	.0000	.00	.00
222	.000E+00	.0000	.0000	.00	.00
223	.000E+00	.0000	.0000	.00	.00
224	.000E+00	.0000	.0000	.00	.00
225	.000E+00	.0000	.0000	.00	.00
226	.000E+00	.0000	.0000	.00	.00
227	.000E+00	.0000	.0000	.00	.00
228	.000E+00	.0000	.0000	.00	.00
229	.000E+00	.0000	.0000	.00	.00
230	.000E+00	.0000	.0000	.00	.00
231	.000E+00	.0000	.0000	.00	.00
232	.000E+00	.0000	.0000	.00	.00
233	.000E+00	.0000	.0000	.00	.00
234	.000E+00	.0000	.0000	.00	.00
235	.000E+00	.0000	.0000	.00	.00
236	.000E+00	.0000	.0000	.00	.00
237	.000E+00	.0000	.0000	.00	.00
238	.000E+00	.0000	.0000	.00	.00
239	.000E+00	.0000	.0000	.00	.00
240	.000E+00	.0000	.0000	.00	.00
241	.000E+00	.0000	.0000	.00	.00
242	.000E+00	.0000	.0000	.00	.00
243	.000E+00	.0000	.0000	.00	.00
244	.000E+00	.0000	.0000	.00	.00
245	.000E+00	.0000	.0000	.00	.00
246	.000E+00	.0000	.0000	.00	.00
247	.000E+00	.0000	.0000	.00	.00
248	.000E+00	.0000	.0000	.00	.00
249	.000E+00	.0000	.0000	.00	.00

TABLE C-5

PRE-MAIN-SEQUENCE BINARY MODEL FOR U CEPHEI

PRIMARY MASS = 3.19 $M_{\odot}$

PERIOD = 2.493 DAYS

MODEL	TIME	LOG(L/L _{SUN})	LOG(TEMP)	ROQUE	ED	D/PSUN
1	1.507E+11	1.4776	3.7502	.02		5.72
2	3.015E+11	1.4702	3.7510	.02		5.62
3	4.522E+11	1.4820	3.7535	.02		5.66
4	6.020E+11	1.4842	3.7551	.02		5.63
5	7.537E+11	1.4864	3.7568	.07		5.60
6	9.044E+11	1.4885	3.7584	.07		5.57
7	1.055E+12	1.4907	3.7600	.06		5.55
8	1.206E+12	1.4929	3.7617	.06		5.52
9	1.357E+12	1.4951	3.7633	.05		5.49
10	1.507E+12	1.4972	3.7649	.05		5.46
11	1.658E+12	1.4994	3.7666	.04		5.44
12	1.809E+12	1.5016	3.7682	.04		5.41
13	1.960E+12	1.5038	3.7698	.03		5.38
14	2.110E+12	1.5060	3.7715	.03		5.36
15	2.261E+12	1.5081	3.7731	.02		5.33
16	2.412E+12	1.5103	3.7747	.02		5.30
17	2.562E+12	1.5125	3.7764	.01		5.28
18	2.713E+12	1.5147	3.7780	.01		5.25
19	2.864E+12	1.5169	3.7796	.00		5.22
20	3.015E+12	1.5190	3.7812	.00		5.20
21	3.165E+12	1.5212	3.7829	.00		5.17
22	3.316E+12	1.5234	3.7845	.00		5.14
23	3.467E+12	1.5256	3.7862	.00		5.12
24	3.618E+12	1.5278	3.7878	.08		5.09
25	3.768E+12	1.5299	3.7894	.88		5.07
26	3.919E+12	1.5321	3.7911	.07		5.04
27	4.070E+12	1.5343	3.7927	.07		5.02
28	4.221E+12	1.5365	3.7943	.06		4.99
29	4.371E+12	1.5387	3.7960	.06		4.97
30	4.522E+12	1.5409	3.7976	.06		4.94
31	4.673E+12	1.5430	3.7992	.05		4.92
32	4.823E+12	1.5452	3.8009	.05		4.89
33	4.974E+12	1.5474	3.8025	.04		4.87
34	5.125E+12	1.5496	3.8041	.04		4.84
35	5.276E+12	1.5517	3.8058	.03		4.82
36	5.426E+12	1.5539	3.8074	.03		4.80
37	5.577E+12	1.5561	3.8090	.03		4.77
38	5.728E+12	1.5583	3.8107	.02		4.75
39	5.879E+12	1.5605	3.8123	.02		4.72
40	6.029E+12	1.5626	3.8139	.01		4.70
41	6.180E+12	1.5648	3.8156	.01		4.68
42	6.331E+12	1.5670	3.8172	.01		4.65
43	6.481E+12	1.5692	3.8188	.00		4.63
44	6.632E+12	1.5714	3.8205	.00		4.61
45	6.783E+12	1.5735	3.8221	.70		4.58
46	6.933E+12	1.5757	3.8237	.70		4.56
47	7.084E+12	1.5779	3.8254	.70		4.54
48	7.235E+12	1.5801	3.8270	.70		4.52
49	7.386E+12	1.5823	3.8286	.73		4.49

MODEI	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE	ED	Q/PSUM
50	7.527E+12	1.5244	3.3303	.77		4.47
51	7.697E+12	1.5266	3.3310	.77		4.45
52	7.339E+12	1.5322	3.3335	.77		4.42
53	7.280E+12	1.5010	3.3352	.76		4.40
54	8.120E+12	1.5032	3.3368	.76		4.38
55	8.220E+12	1.5054	3.3385	.76		4.36
56	8.441E+12	1.5075	3.3401	.75		4.34
57	8.502E+12	1.5007	3.3417	.75		4.32
58	8.742E+12	1.6012	3.3434	.74		4.30
59	8.803E+12	1.6041	3.3450	.74		4.27
60	9.044E+12	1.6063	3.3466	.74		4.25
61	9.104E+12	1.6084	3.3483	.73		4.23
62	9.345E+12	1.6106	3.3499	.73		4.21
63	9.406E+12	1.6128	3.3515	.73		4.19
64	9.647E+12	1.6150	3.3532	.72		4.17
65	9.707E+12	1.6172	3.3548	.72		4.15
66	9.948E+12	1.6194	3.3564	.71		4.13
67	1.010E+13	1.6215	3.3581	.71		4.11
68	1.025E+13	1.6237	3.3597	.71		4.09
69	1.040E+13	1.6259	3.3613	.70		4.06
70	1.055E+13	1.6281	3.3630	.70		4.04
71	1.070E+13	1.6303	3.3646	.70		4.02
72	1.085E+13	1.6325	3.3662	.69		4.00
73	1.100E+13	1.6347	3.3679	.69		3.98
74	1.115E+13	1.6368	3.3695	.69		3.96
75	1.130E+13	1.6390	3.3711	.69		3.94
76	1.146E+13	1.6412	3.3728	.68		3.92
77	1.161E+13	1.6434	3.3744	.69		3.91
78	1.176E+13	1.6456	3.3760	.67		3.90
79	1.191E+13	1.6478	3.3777	.67		3.87
80	1.206E+13	1.6500	3.3793	.67		3.85
81	1.221E+13	1.6521	3.3809	.66		3.83
82	1.236E+13	1.6543	3.3826	.66		3.91
83	1.251E+13	1.6565	3.3842	.66		3.70
84	1.266E+13	1.6587	3.3859	.65		3.77
85	1.281E+13	1.6609	3.3875	.65		3.75
86	1.296E+13	1.6631	3.3891	.65		3.73
87	1.311E+13	1.6653	3.3908	.64		3.71
88	1.326E+13	1.6675	3.3924	.64		3.70
89	1.341E+13	1.6697	3.3940	.64		3.69
90	1.357E+13	1.6718	3.3957	.63		3.66
91	1.372E+13	1.6740	3.3973	.63		3.64
92	1.387E+13	1.6762	3.3989	.63		3.62
93	1.402E+13	1.6784	3.3996	.62		3.60
94	1.417E+13	1.6806	3.4022	.62		3.50
95	1.432E+13	1.6828	3.4039	.62		3.57
96	1.447E+13	1.6850	3.4055	.61		3.55
97	1.462E+13	1.6872	3.4071	.61		3.53
98	1.477E+13	1.6894	3.4088	.61		3.51
99	1.492E+13	1.6916	3.4104	.61		3.50

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	LOG(R/R)	LOG(SUN)
100	1.507E+13	1.6038	3.0120	.60	3.42
101	1.522E+13	1.6060	3.0137	.60	3.45
102	1.537E+13	1.6082	3.0153	.60	3.45
103	1.552E+13	1.7004	3.0160	.59	3.43
104	1.568E+13	1.7025	3.0186	.59	3.41
105	1.583E+13	1.7047	3.0202	.59	3.39
106	1.598E+13	1.7069	3.0210	.58	3.33
107	1.613E+13	1.7091	3.0235	.58	3.36
108	1.628E+13	1.7113	3.0251	.58	3.34
109	1.643E+13	1.7135	3.0268	.58	3.33
110	1.658E+13	1.7157	3.0284	.57	3.31
111	1.673E+13	1.7179	3.0301	.57	3.29
112	1.688E+13	1.7201	3.0317	.57	3.28
113	1.703E+13	1.7223	3.0333	.56	3.26
114	1.718E+13	1.7245	3.0350	.56	3.24
115	1.733E+13	1.7267	3.0366	.56	3.23
116	1.748E+13	1.7290	3.0382	.56	3.21
117	1.763E+13	1.7312	3.0399	.55	3.20
118	1.778E+13	1.7334	3.0415	.55	3.18
119	1.794E+13	1.7356	3.0432	.55	3.16
120	1.809E+13	1.7378	3.0448	.55	3.15
121	1.824E+13	1.7400	3.0464	.54	3.13
122	1.839E+13	1.7422	3.0481	.54	3.12
123	1.854E+13	1.7444	3.0497	.54	3.10
124	1.869E+13	1.7466	3.0514	.53	3.09
125	1.884E+13	1.7488	3.0530	.53	3.07
126	1.899E+13	1.7510	3.0547	.53	3.05
127	1.914E+13	1.7533	3.0563	.53	3.04
128	1.929E+13	1.7555	3.0579	.52	3.02
129	1.944E+13	1.7577	3.0596	.52	3.01
130	1.959E+13	1.7599	3.0612	.52	2.99
131	1.974E+13	1.7621	3.0629	.52	2.98
132	1.990E+13	1.7644	3.0645	.51	2.96
133	2.005E+13	1.7666	3.0662	.51	2.95
134	2.020E+13	1.7688	3.0678	.51	2.93
135	2.035E+13	1.7710	3.0694	.51	2.92
136	2.050E+13	1.7733	3.0711	.50	2.91
137	2.065E+13	1.7755	3.0727	.50	2.89
138	2.080E+13	1.7777	3.0744	.50	2.88
139	2.095E+13	1.7799	3.0760	.50	2.86
140	2.110E+13	1.7822	3.0777	.49	2.85
141	2.125E+13	1.7844	3.0793	.49	2.83
142	2.140E+13	1.7866	3.0810	.49	2.82
143	2.155E+13	1.7888	3.0826	.49	2.81
144	2.170E+13	1.7911	3.0843	.48	2.79
145	2.185E+13	1.7934	3.0859	.48	2.77
146	2.200E+13	1.7956	3.0876	.48	2.76
147	2.215E+13	1.7978	3.0892	.48	2.75
148	2.231E+13	1.8001	3.0909	.47	2.74
149	2.246E+13	1.8023	3.0925	.47	2.72

MODEL	TIME	LOG(L/L _{SUN})	LOG(TEMP)	POURCE	ED	DAYSIN
150	2.261E+13	1.5046	3.0042	.47		2.71
151	2.276E+13	1.5060	3.0050	.47		2.69
152	2.291E+13	1.5001	3.0075	.46		2.68
153	2.306E+13	1.5114	3.0091	.46		2.67
154	2.321E+13	1.5136	4.0009	.46		2.65
155	2.336E+13	1.5159	4.0024	.46		2.64
156	2.351E+13	1.5192	4.0041	.46		2.63
157	2.366E+13	1.5204	4.0057	.45		2.62
158	2.381E+13	1.5227	4.0074	.45		2.60
159	2.396E+13	1.5250	4.0091	.45		2.59
160	2.411E+13	1.5273	4.0107	.45		2.58
161	2.427E+13	1.5295	4.0124	.44		2.56
162	2.442E+13	1.5319	4.0140	.44		2.55
163	2.457E+13	1.5341	4.0157	.44		2.54
164	2.472E+13	1.5364	4.0174	.44		2.52
165	2.487E+13	1.5387	4.0190	.44		2.51
166	2.502E+13	1.5410	4.0207	.43		2.50
167	2.517E+13	1.5433	4.0223	.43		2.49
168	2.532E+13	1.5456	4.0240	.43		2.47
169	2.547E+13	1.5479	4.0257	.42		2.46
170	2.562E+13	1.5502	4.0273	.42		2.45
171	2.577E+13	1.5525	4.0290	.42		2.44
172	2.592E+13	1.5548	4.0307	.42		2.43
173	2.607E+13	1.5572	4.0323	.42		2.41
174	2.622E+13	1.5595	4.0340	.42		2.40
175	2.637E+13	1.5618	4.0357	.41		2.39
176	2.653E+13	1.5642	4.0374	.41		2.38
177	2.668E+13	1.5665	4.0390	.41		2.37
178	2.683E+13	1.5689	4.0407	.41		2.35
179	2.698E+13	1.5712	4.0424	.41		2.34
180	2.713E+13	1.5736	4.0441	.40		2.33
181	2.728E+13	1.5759	4.0457	.40		2.32
182	2.743E+13	1.5783	4.0474	.40		2.31
183	2.758E+13	1.5807	4.0491	.40		2.30
184	2.773E+13	1.5831	4.0508	.40		2.28
185	2.788E+13	1.5855	4.0525	.39		2.27
186	2.803E+13	1.5879	4.0542	.39		2.26
187	2.818E+13	1.5903	4.0559	.39		2.25
188	2.833E+13	1.5927	4.0575	.39		2.24
189	2.848E+13	1.5951	4.0592	.39		2.23
190	2.864E+13	1.5975	4.0609	.38		2.22
191	2.879E+13	1.5999	4.0626	.38		2.21
192	2.894E+13	1.6024	4.0643	.38		2.19
193	2.909E+13	1.6048	4.0660	.37		2.18
194	2.924E+13	1.6072	4.0677	.37		2.17
195	2.939E+13	1.6097	4.0694	.37		2.16
196	2.954E+13	1.6122	4.0711	.37		2.15
197	2.969E+13	1.6147	4.0728	.37		2.14
198	2.984E+13	1.6171	4.0745	.37		2.13
199	2.999E+13	1.6196	4.0763	.37		2.12

WAVE	TIME	LOG(LASIN)	LOG(TREF)	BOUQU ET	PARSIN
200	3.014E+13	1.0222	4.0730	.37	2.11
201	3.022E+13	1.0247	4.0797	.36	2.10
202	3.044E+13	1.0272	4.0814	.36	2.09
203	3.056E+13	1.0297	4.0831	.36	2.08
204	3.074E+13	1.0323	4.0849	.36	2.07
205	3.090E+13	1.0348	4.0866	.36	2.06
206	3.105E+13	1.0374	4.0883	.35	2.05
207	3.120E+13	1.0400	4.0901	.35	2.04
208	3.135E+13	1.0426	4.0918	.35	2.03
209	3.150E+13	1.0452	4.0935	.35	2.01
210	3.165E+13	1.0478	4.0953	.35	2.00
211	3.180E+13	1.0504	4.0970	.35	1.99
212	3.195E+13	1.0531	4.0988	.34	1.98
213	3.210E+13	1.0557	4.1005	.34	1.97
214	3.225E+13	1.0584	4.1023	.34	1.97
215	3.240E+13	1.0611	4.1040	.34	1.96
216	3.255E+13	1.0638	4.1058	.34	1.95
217	3.270E+13	1.0665	4.1076	.34	1.94
218	3.285E+13	1.0692	4.1093	.33	1.93
219	3.301E+13	1.0719	4.1111	.33	1.92
220	3.316E+13	1.0747	4.1129	.33	1.91
221	3.331E+13	1.0775	4.1147	.33	1.90
222	3.346E+13	1.0803	4.1165	.33	1.89
223	3.361E+13	1.0831	4.1182	.33	1.88
224	3.376E+13	1.0859	4.1200	.32	1.87
225	3.391E+13	1.0888	4.1218	.32	1.86
226	3.406E+13	1.0917	4.1237	.32	1.85
227	3.421E+13	1.0246	4.1255	.32	1.84
228	3.436E+13	1.0975	4.1273	.32	1.83
229	3.451E+13	2.0004	4.1291	.32	1.82
230	3.466E+13	2.0034	4.1309	.31	1.81
231	3.481E+13	2.0063	4.1328	.31	1.80
232	3.496E+13	2.0093	4.1346	.31	1.80
233	3.511E+13	2.0124	4.1364	.31	1.79
234	3.527E+13	2.0154	4.1383	.31	1.78
235	3.542E+13	2.0185	4.1402	.31	1.77
236	3.557E+13	2.0216	4.1420	.30	1.76
237	3.572E+13	2.0247	4.1439	.30	1.75
238	3.587E+13	2.0278	4.1458	.30	1.74
239	3.602E+13	2.0310	4.1476	.30	1.73
240	3.617E+13	2.0342	4.1495	.30	1.72
241	3.632E+13	2.0375	4.1514	.30	1.72
242	3.647E+13	2.0407	4.1533	.30	1.71
243	3.662E+13	2.0440	4.1553	.29	1.70
244	3.677E+13	2.0474	4.1572	.29	1.69
245	3.692E+13	2.0507	4.1591	.29	1.68
246	3.707E+13	2.0541	4.1610	.29	1.67
247	3.722E+13	2.0575	4.1630	.29	1.67
248	3.737E+13	2.0610	4.1649	.29	1.66
249	3.752E+13	2.0645	4.1669	.29	1.65

TABLE C-6

PRE-MAIN-SEQUENCE BINARY MODEL FOR U CEPHEI

SECONDARY MASS = $1.53 M_{\odot}$

PERIOD = 2.493 DAYS

MODE	TIME	LOG(L/L SUN)	LOG(TEMP)	ROCHE FR	R/R SUN
1	5.954E+09	3.4216	3.3946	.00	4.07
2	8.961E+09	3.4027	3.3962	.00	4.05
3	1.202E+09	3.5237	3.3973	.03	4.03
4	1.533E+09	3.5648	3.3995	.03	4.01
5	1.381E+09	3.5458	3.4011	.07	3.99
6	2.244E+09	3.5269	3.4027	.07	3.97
7	2.630E+09	3.5080	3.4044	.06	3.95
8	3.032E+09	3.4890	3.4060	.06	3.93
9	3.455E+09	3.4701	3.4076	.05	3.91
10	3.898E+09	3.4511	3.4093	.05	3.89
11	4.364E+09	3.4322	3.4109	.04	3.87
12	4.852E+09	3.4132	3.4125	.04	3.85
13	5.366E+09	3.3943	3.4141	.03	3.83
14	5.905E+09	3.3754	3.4158	.03	3.82
15	6.471E+09	3.3564	3.4174	.02	3.80
16	7.065E+09	3.3375	3.4190	.01	3.78
17	7.688E+09	3.3185	3.4207	.01	3.76
18	8.343E+09	3.2996	3.4223	.01	3.74
19	9.030E+09	3.2807	3.4239	.00	3.72
20	9.752E+09	3.2617	3.4256	.00	3.70
21	1.051E+10	3.2428	3.4272	.00	3.68
22	1.130E+10	3.2238	3.4288	.00	3.67
23	1.214E+10	3.2049	3.4305	.00	3.65
24	1.302E+10	3.1860	3.4321	.00	3.63
25	1.394E+10	3.1670	3.4337	.03	3.61
26	1.490E+10	3.1481	3.4354	.07	3.59
27	1.591E+10	3.1291	3.4370	.07	3.57
28	1.698E+10	3.1102	3.4386	.06	3.56
29	1.810E+10	3.0913	3.4403	.06	3.54
30	1.927E+10	3.0723	3.4419	.06	3.52
31	2.050E+10	3.0534	3.4435	.05	3.50
32	2.179E+10	3.0344	3.4452	.05	3.49
33	2.315E+10	3.0155	3.4469	.04	3.47
34	2.458E+10	2.9966	3.4484	.04	3.45
35	2.607E+10	2.9776	3.4501	.03	3.43
36	2.764E+10	2.9587	3.4517	.03	3.42
37	2.929E+10	2.9397	3.4533	.03	3.40
38	3.102E+10	2.9208	3.4550	.02	3.38
39	3.284E+10	2.9019	3.4566	.02	3.37
40	3.475E+10	2.8829	3.4582	.01	3.35
41	3.675E+10	2.8640	3.4599	.01	3.33
42	3.885E+10	2.8450	3.4615	.01	3.32
43	4.106E+10	2.8261	3.4631	.00	3.30
44	4.338E+10	2.8071	3.4648	.00	3.28
45	4.581E+10	2.7882	3.4664	.00	3.27
46	4.837E+10	2.7693	3.4680	.00	3.25
47	5.105E+10	2.7503	3.4697	.00	3.23
48	5.386E+10	2.7314	3.4713	.02	3.22
49	5.682E+10	2.7124	3.4729	.03	3.20

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	ROGUE SP	Q/PSUN
50	5.092E+10	2.6235	3.4746	.77	3.12
51	6.318E+10	2.6746	3.4762	.77	3.17
52	6.660E+10	2.6556	3.4779	.77	3.15
53	7.019E+10	2.6367	3.4795	.76	3.14
54	7.394E+10	2.6177	3.4811	.76	3.12
55	7.791E+10	2.5999	3.4827	.76	3.11
56	8.207E+10	2.5799	3.4844	.75	3.09
57	8.643E+10	2.5609	3.4860	.75	3.08
58	9.101E+10	2.5420	3.4876	.74	3.06
59	9.581E+10	2.5230	3.4903	.74	3.04
60	1.009E+11	2.5041	3.4909	.74	3.03
61	1.062E+11	2.4851	3.4925	.73	3.01
62	1.117E+11	2.4662	3.4942	.73	3.00
63	1.176E+11	2.4473	3.4958	.73	2.98
64	1.237E+11	2.4283	3.4974	.72	2.97
65	1.301E+11	2.4094	3.4991	.72	2.95
66	1.369E+11	2.3904	3.5007	.71	2.94
67	1.440E+11	2.3715	3.5023	.71	2.92
68	1.514E+11	2.3525	3.5040	.71	2.91
69	1.592E+11	2.3336	3.5056	.70	2.90
70	1.674E+11	2.3147	3.5072	.70	2.89
71	1.760E+11	2.2957	3.5089	.70	2.87
72	1.851E+11	2.2768	3.5105	.69	2.85
73	1.946E+11	2.2578	3.5121	.69	2.84
74	2.045E+11	2.2389	3.5138	.69	2.82
75	2.150E+11	2.2199	3.5154	.68	2.81
76	2.260E+11	2.2010	3.5170	.68	2.80
77	2.375E+11	2.1821	3.5187	.68	2.78
78	2.496E+11	2.1631	3.5203	.67	2.77
79	2.623E+11	2.1442	3.5219	.67	2.75
80	2.757E+11	2.1252	3.5236	.67	2.74
81	2.897E+11	2.1063	3.5252	.66	2.73
82	3.044E+11	2.0873	3.5268	.66	2.71
83	3.199E+11	2.0684	3.5285	.66	2.70
84	3.361E+11	2.0495	3.5301	.65	2.69
85	3.531E+11	2.0305	3.5317	.65	2.67
86	3.709E+11	2.0116	3.5334	.65	2.66
87	3.897E+11	1.9926	3.5350	.64	2.65
88	4.094E+11	1.9737	3.5366	.64	2.63
89	4.301E+11	1.9547	3.5383	.64	2.62
90	4.518E+11	1.9358	3.5399	.63	2.61
91	4.745E+11	1.9169	3.5415	.63	2.59
92	4.985E+11	1.8979	3.5431	.63	2.58
93	5.236E+11	1.8790	3.5448	.62	2.57
94	5.499E+11	1.8600	3.5464	.62	2.55
95	5.774E+11	1.8411	3.5480	.62	2.54
96	6.067E+11	1.8221	3.5497	.61	2.53
97	6.372E+11	1.8032	3.5513	.61	2.52
98	6.692E+11	1.7842	3.5529	.61	2.50
99	7.028E+11	1.7653	3.5546	.61	2.49

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	POCHE 50	POCHE 50
100	7.381E+11	1.7163	3.5542	.60	2.42
101	7.752E+11	1.7274	3.5579	.60	2.47
102	8.141E+11	1.7385	3.5595	.60	2.45
103	8.540E+11	1.6205	3.5611	.50	2.44
104	8.978E+11	1.6706	3.5627	.50	2.42
105	9.428E+11	1.6516	3.5644	.50	2.42
106	9.901E+11	1.6227	3.5660	.52	2.41
107	1.040E+12	1.6137	3.5676	.52	2.39
108	1.092E+12	1.5042	3.5693	.52	2.32
109	1.146E+12	1.5758	3.5709	.52	2.37
110	1.204E+12	1.5560	3.5725	.57	2.36
111	1.264E+12	1.5379	3.5742	.57	2.35
112	1.327E+12	1.5190	3.5758	.57	2.33
113	1.394E+12	1.5000	3.5774	.56	2.32
114	1.464E+12	1.4811	3.5791	.56	2.31
115	1.537E+12	1.4621	3.5807	.56	2.30
116	1.614E+12	1.4432	3.5824	.56	2.29
117	1.694E+12	1.4242	3.5840	.55	2.29
118	1.779E+12	1.4053	3.5856	.55	2.27
119	1.869E+12	1.3863	3.5873	.55	2.25
120	1.961E+12	1.3674	3.5890	.55	2.24
121	2.059E+12	1.3484	3.5905	.54	2.22
122	2.162E+12	1.3295	3.5922	.54	2.22
123	2.270E+12	1.3105	3.5939	.54	2.21
124	2.384E+12	1.2916	3.5954	.53	2.20
125	2.503E+12	1.2726	3.5971	.53	2.19
126	2.628E+12	1.2537	3.5987	.53	2.19
127	2.759E+12	1.2347	3.6003	.53	2.17
128	2.907E+12	1.2158	3.6020	.52	2.15
129	3.062E+12	1.1969	3.6036	.52	2.14
130	3.194E+12	1.1778	3.6052	.52	2.13
131	3.353E+12	1.1589	3.6069	.52	2.12
132	3.520E+12	1.1399	3.6085	.51	2.11
133	3.696E+12	1.1210	3.6101	.51	2.10
134	3.881E+12	1.1020	3.6118	.51	2.09
135	4.074E+12	1.0831	3.6134	.51	2.08
136	4.278E+12	1.0641	3.6150	.50	2.07
137	4.491E+12	1.0451	3.6167	.50	2.06
138	4.716E+12	1.0262	3.6183	.50	2.05
139	4.951E+12	1.0072	3.6199	.50	2.04
140	5.198E+12	.9883	3.6216	.49	2.03
141	5.457E+12	.9693	3.6232	.49	2.02
142	5.730E+12	.9503	3.6249	.49	2.01
143	6.016E+12	.9314	3.6265	.49	2.00
144	6.316E+12	.9124	3.6281	.49	1.99
145	6.631E+12	.8935	3.6297	.48	1.98
146	6.962E+12	.8745	3.6314	.48	1.97
147	7.309E+12	.8555	3.6330	.48	1.96
148	7.673E+12	.8366	3.6346	.47	1.95
149	8.057E+12	.8176	3.6363	.47	1.94

MODEL	TIME	LOG(LA SUN)	LOG(TREE)	ROQUE ER	PARSUN
150	9.150E+12	.7226	3.6379	.47	1.92
151	9.381E+12	.7707	3.6396	.47	1.92
152	9.324E+12	.7607	3.6412	.46	1.91
153	9.790E+12	.7417	3.6423	.46	1.90
154	1.028E+13	.7227	3.6445	.46	1.89
155	1.072E+13	.7038	3.6461	.46	1.88
156	1.133E+13	.6849	3.6477	.46	1.87
157	1.182E+13	.6658	3.6494	.45	1.86
158	1.337E+13	.1026	3.6510	.45	1.85
159	1.484E+13	.1047	3.6526	.45	1.84
160	1.631E+13	.1069	3.6543	.45	1.84
161	1.779E+13	.1091	3.6559	.44	1.83
162	1.925E+13	.1113	3.6575	.44	1.82
163	2.072E+13	.1135	3.6592	.44	1.81
164	2.219E+13	.1157	3.6609	.44	1.80
165	2.366E+13	.1179	3.6625	.44	1.79
166	2.513E+13	.1201	3.6641	.43	1.78
167	2.660E+13	.1223	3.6657	.43	1.77
168	2.807E+13	.1245	3.6674	.43	1.76
169	2.954E+13	.1267	3.6690	.43	1.75
170	3.101E+13	.1289	3.6706	.42	1.75
171	3.248E+13	.1311	3.6723	.42	1.74
172	3.395E+13	.1333	3.6739	.42	1.73
173	3.542E+13	.1355	3.6755	.42	1.72
174	3.689E+13	.1376	3.6772	.42	1.71
175	3.836E+13	.1398	3.6788	.41	1.70
176	3.983E+13	.1420	3.6805	.41	1.69
177	4.130E+13	.1442	3.6821	.41	1.69
178	4.277E+13	.1464	3.6837	.41	1.68
179	4.424E+13	.1486	3.6854	.41	1.67
180	4.571E+13	.1508	3.6870	.40	1.66
181	4.718E+13	.1530	3.6887	.40	1.65
182	4.865E+13	.1552	3.6903	.40	1.64
183	5.012E+13	.1574	3.6919	.40	1.64
184	5.159E+13	.1597	3.6936	.40	1.63
185	5.306E+13	.1619	3.6952	.39	1.62
186	5.453E+13	.1641	3.6969	.39	1.61
187	5.600E+13	.1663	3.6985	.39	1.60
188	5.747E+13	.1685	3.7001	.39	1.59
189	5.894E+13	.1707	3.7018	.39	1.59
190	6.041E+13	.1729	3.7034	.38	1.58
191	6.188E+13	.1751	3.7051	.38	1.57
192	6.335E+13	.1773	3.7067	.38	1.56
193	6.482E+13	.1795	3.7083	.38	1.56
194	6.629E+13	.1817	3.7100	.38	1.55
195	6.776E+13	.1840	3.7116	.37	1.54
196	6.923E+13	.1862	3.7133	.37	1.53
197	7.070E+13	.1884	3.7149	.37	1.52
198	7.217E+13	.1906	3.7165	.37	1.52
199	7.364E+13	.1929	3.7182	.37	1.51

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	POURCE 50	240000
200	7.511E+13	.1050	3.7102	.37	1.50
201	7.658E+13	.1072	3.7215	.36	1.49
202	7.805E+13	.1095	3.7231	.36	1.49
203	7.953E+13	.2017	3.7249	.36	1.49
204	8.100E+13	.2039	3.7264	.36	1.47
205	8.247E+13	.2062	3.7291	.36	1.46
206	8.394E+13	.2084	3.7297	.35	1.46
207	8.541E+13	.2106	3.7313	.35	1.45
208	8.688E+13	.2129	3.7330	.35	1.44
209	8.835E+13	.2151	3.7346	.35	1.44
210	8.982E+13	.2173	3.7363	.35	1.43
211	9.129E+13	.2196	3.7379	.35	1.42
212	9.276E+13	.2218	3.7396	.34	1.41
213	9.423E+13	.2240	3.7412	.34	1.41
214	9.570E+13	.2263	3.7429	.34	1.40
215	9.717E+13	.2285	3.7445	.34	1.39
216	9.864E+13	.2308	3.7462	.34	1.39
217	1.001E+14	.2330	3.7479	.34	1.38
218	1.016E+14	.2353	3.7495	.33	1.37
219	1.030E+14	.2375	3.7511	.33	1.37
220	1.045E+14	.2398	3.7528	.33	1.36
221	1.060E+14	.2420	3.7544	.33	1.35
222	1.075E+14	.2443	3.7561	.33	1.34
223	1.089E+14	.2466	3.7577	.33	1.34
224	1.104E+14	.2488	3.7594	.32	1.33
225	1.119E+14	.2511	3.7611	.32	1.32
226	1.133E+14	.2534	3.7627	.32	1.32
227	1.148E+14	.2556	3.7644	.32	1.31
228	1.163E+14	.2579	3.7660	.32	1.31
229	1.178E+14	.2602	3.7677	.32	1.30
230	1.192E+14	.2625	3.7693	.31	1.29
231	1.207E+14	.2648	3.7710	.31	1.29
232	1.222E+14	.2670	3.7727	.31	1.28
233	1.236E+14	.2693	3.7743	.31	1.27
234	1.251E+14	.2716	3.7760	.31	1.27
235	1.266E+14	.2739	3.7777	.31	1.26
236	1.280E+14	.2762	3.7793	.30	1.25
237	1.295E+14	.2785	3.7810	.30	1.25
238	1.310E+14	.2809	3.7826	.30	1.24
239	1.325E+14	.2832	3.7843	.30	1.24
240	1.339E+14	.2855	3.7860	.30	1.23
241	1.354E+14	.2878	3.7877	.30	1.22
242	1.369E+14	.2901	3.7893	.30	1.22
243	1.383E+14	.2925	3.7910	.30	1.21
244	1.398E+14	.2948	3.7927	.30	1.20
245	1.413E+14	.2971	3.7943	.30	1.19
246	1.427E+14	.2995	3.7960	.30	1.19
247	1.442E+14	.3018	3.7977	.30	1.19
248	1.457E+14	.3042	3.7994	.30	1.18
249	1.472E+14	.3066	3.8011	.30	1.17

TABLE C-7

PRE-MAIN-SEQUENCE BINARY MODEL FOR AI DRACONIS

PRIMARY MASS = 2.18 $M_{\odot}$

PERIOD = 1.199 DAYS

MODEL	TIME	LOG(L/L/SUN)	LOG(TEMP)	POUCHES	LOGSUM
1	4.006E+11	.0017	3.7205	.00	3.00
2	0.812E+11	.0030	3.7411	.00	3.00
3	1.472E+12	.0061	3.7428	.03	3.05
4	1.063E+12	.0082	3.7444	.03	3.05
5	2.453E+12	.0105	3.7461	.07	3.07
6	2.044E+12	.0127	3.7477	.07	3.07
7	3.134E+12	.0140	3.7493	.06	3.00
8	3.025E+12	.0171	3.7510	.06	2.00
9	4.416E+12	.0193	3.7526	.05	2.07
10	4.006E+12	.0215	3.7543	.05	2.06
11	5.307E+12	.0237	3.7559	.04	2.04
12	5.888E+12	.0260	3.7575	.04	2.03
13	6.378E+12	.0282	3.7592	.03	2.01
14	6.860E+12	.0304	3.7608	.03	2.00
15	7.350E+12	.0326	3.7625	.02	2.82
16	7.850E+12	.0348	3.7641	.02	2.87
17	8.341E+12	.0370	3.7657	.01	2.86
18	8.831E+12	.0392	3.7674	.01	2.84
19	9.322E+12	.0415	3.7690	.00	2.83
20	9.813E+12	.0437	3.7707	.00	2.81
21	1.030E+13	.0459	3.7723	.00	2.80
22	1.070E+13	.0481	3.7740	.00	2.79
23	1.128E+13	.0503	3.7756	.00	2.77
24	1.178E+13	.0526	3.7772	.83	2.76
25	1.227E+13	.0548	3.7789	.83	2.74
26	1.276E+13	.0570	3.7805	.87	2.73
27	1.325E+13	.0592	3.7822	.87	2.72
28	1.374E+13	.0615	3.7838	.86	2.70
29	1.423E+13	.0637	3.7855	.86	2.69
30	1.472E+13	.0659	3.7871	.86	2.68
31	1.521E+13	.0682	3.7888	.85	2.66
32	1.570E+13	.0704	3.7904	.85	2.65
33	1.619E+13	.0727	3.7921	.84	2.64
34	1.668E+13	.0749	3.7937	.84	2.62
35	1.717E+13	.0771	3.7954	.83	2.61
36	1.766E+13	.0794	3.7970	.83	2.60
37	1.815E+13	.0816	3.7987	.83	2.58
38	1.864E+13	.0839	3.8003	.82	2.57
39	1.913E+13	.0861	3.8020	.82	2.56
40	1.962E+13	.0884	3.8036	.81	2.55
41	2.012E+13	.0906	3.8053	.81	2.53
42	2.061E+13	.0929	3.8069	.81	2.52
43	2.110E+13	.0952	3.8086	.80	2.51
44	2.159E+13	.0974	3.8102	.80	2.49
45	2.208E+13	.0997	3.8119	.79	2.48
46	2.257E+13	1.0020	3.8135	.79	2.47
47	2.306E+13	1.0042	3.8152	.79	2.46
48	2.355E+13	1.0065	3.8169	.78	2.45
49	2.404E+13	1.0088	3.8185	.78	2.43

MODEL	TIME	LOG(L/USIN)	LOG(TEFF)	ROCHE	ED	DAYSIN
50	2.453E+13	1.0111	3.8202	.77		2.42
51	2.502E+13	1.0134	3.8219	.77		2.41
52	2.551E+13	1.0156	3.8235	.77		2.40
53	2.600E+13	1.0179	3.8252	.76		2.39
54	2.649E+13	1.0202	3.8269	.76		2.37
55	2.698E+13	1.0225	3.8285	.76		2.36
56	2.747E+13	1.0248	3.8301	.75		2.35
57	2.797E+13	1.0271	3.8318	.75		2.34
58	2.846E+13	1.0294	3.8335	.74		2.33
59	2.895E+13	1.0317	3.8351	.74		2.31
60	2.944E+13	1.0341	3.8368	.74		2.30
61	2.993E+13	1.0364	3.8385	.73		2.29
62	3.042E+13	1.0387	3.8401	.73		2.28
63	3.091E+13	1.0410	3.8418	.73		2.27
64	3.140E+13	1.0434	3.8435	.72		2.26
65	3.189E+13	1.0457	3.8452	.72		2.25
66	3.238E+13	1.0481	3.8469	.71		2.23
67	3.287E+13	1.0504	3.8485	.71		2.22
68	3.336E+13	1.0528	3.8502	.71		2.21
69	3.385E+13	1.0551	3.8519	.70		2.20
70	3.434E+13	1.0575	3.8535	.70		2.19
71	3.483E+13	1.0598	3.8552	.70		2.18
72	3.532E+13	1.0622	3.8569	.69		2.17
73	3.581E+13	1.0646	3.8586	.69		2.16
74	3.631E+13	1.0670	3.8603	.69		2.15
75	3.680E+13	1.0694	3.8620	.69		2.14
76	3.729E+13	1.0718	3.8637	.69		2.12
77	3.778E+13	1.0742	3.8653	.69		2.11
78	3.827E+13	1.0766	3.8670	.67		2.10
79	3.876E+13	1.0790	3.8687	.67		2.09
80	3.925E+13	1.0815	3.8704	.67		2.08
81	3.974E+13	1.0839	3.8721	.66		2.07
82	4.023E+13	1.0863	3.8738	.66		2.06
83	4.072E+13	1.0888	3.8755	.66		2.05
84	4.121E+13	1.0912	3.8772	.65		2.04
85	4.170E+13	1.0937	3.8789	.65		2.03
86	4.219E+13	1.0962	3.8806	.65		2.02
87	4.268E+13	1.0987	3.8823	.64		2.01
88	4.317E+13	1.1012	3.8841	.64		2.00
89	4.366E+13	1.1037	3.8858	.64		1.99
90	4.415E+13	1.1062	3.8875	.63		1.98
91	4.465E+13	1.1087	3.8892	.63		1.97
92	4.514E+13	1.1112	3.8909	.63		1.96
93	4.563E+13	1.1137	3.8927	.62		1.95
94	4.612E+13	1.1164	3.8944	.62		1.94
95	4.661E+13	1.1189	3.8961	.62		1.93
96	4.710E+13	1.1215	3.8979	.61		1.92
97	4.759E+13	1.1241	3.8996	.61		1.91
98	4.808E+13	1.1267	3.9013	.61		1.90
99	4.857E+13	1.1293	3.9031	.61		1.89

MODEL	TIME	LOG(L/L/SUN)	LOG(TEMP)	POURCE 50	24PSUN
100	4.206E+13	1.1310	3.2043	.60	1.33
101	4.255E+13	1.1346	3.2056	.60	1.37
102	5.004E+13	1.1372	3.2083	.60	1.37
103	5.053E+13	1.1390	3.2101	.50	1.36
104	5.102E+13	1.1426	3.2113	.50	1.35
105	5.151E+13	1.1453	3.2136	.50	1.34
106	5.200E+13	1.1480	3.2154	.50	1.33
107	5.240E+13	1.1507	3.2171	.53	1.32
108	5.290E+13	1.1535	3.2190	.53	1.31
109	5.340E+13	1.1562	3.2207	.53	1.30
110	5.397E+13	1.1590	3.2225	.57	1.70
111	5.446E+13	1.1618	3.2243	.57	1.79
112	5.495E+13	1.1646	3.2260	.57	1.77
113	5.544E+13	1.1675	3.2279	.56	1.77
114	5.593E+13	1.1703	3.2296	.56	1.76
115	5.642E+13	1.1732	3.2315	.56	1.75
116	5.691E+13	1.1761	3.2333	.56	1.74
117	5.740E+13	1.1790	3.2351	.55	1.73
118	5.789E+13	1.1810	3.2360	.55	1.72
119	5.838E+13	1.1840	3.2387	.55	1.71
120	5.887E+13	1.1870	3.2406	.55	1.70
121	5.936E+13	1.1900	3.2424	.54	1.70
122	5.985E+13	1.1930	3.2442	.54	1.60
123	6.034E+13	1.1960	3.2461	.54	1.69
124	6.083E+13	1.2000	3.2490	.53	1.67
125	6.133E+13	1.2031	3.2498	.53	1.66
126	6.182E+13	1.2062	3.2517	.53	1.65
127	6.231E+13	1.2094	3.2536	.53	1.65
128	6.280E+13	1.2126	3.2554	.52	1.64
129	6.329E+13	1.2158	3.2573	.52	1.63
130	6.378E+13	1.2190	3.2592	.52	1.62
131	6.427E+13	1.2223	3.2611	.52	1.61
132	6.476E+13	1.2256	3.2631	.51	1.60
133	6.525E+13	1.2289	3.2650	.51	1.60
134	6.574E+13	1.2323	3.2669	.51	1.59
135	6.623E+13	1.2356	3.2698	.51	1.58
136	6.672E+13	1.2391	3.2708	.50	1.57
137	6.721E+13	1.2425	3.2727	.50	1.57
138	6.770E+13	1.2460	3.2747	.50	1.56
139	6.819E+13	1.2496	3.2767	.50	1.55
140	6.868E+13	1.2531	3.2786	.49	1.54
141	6.917E+13	1.2567	3.2806	.49	1.53
142	6.966E+13	1.2604	3.2826	.49	1.52
143	7.016E+13	1.2641	3.2846	.49	1.52
144	7.065E+13	1.2679	3.2867	.48	1.51
145	7.114E+13	1.2715	3.2887	.48	1.50
146	7.163E+13	1.2754	3.2907	.48	1.50
147	7.212E+13	1.2792	3.2928	.48	1.49
148	7.261E+13	1.2831	3.2949	.47	1.48
149	7.310E+13	1.2870	3.2969	.47	1.47

MODEL	TIME	LOG(L/L(SUN))	LOG(TEMP)	POSSIBLE	SD	SD(SUN)
150	7.352E+13	1.2210	3.2222	.47		1.47
151	7.408E+13	1.2251	4.2211	.47		1.46
152	7.457E+13	1.2292	4.2232	.46		1.45
153	7.506E+13	1.2333	4.2253	.46		1.44
154	7.555E+13	1.2375	4.2275	.46		1.44
155	7.604E+13	1.2417	4.2296	.46		1.43
156	7.653E+13	1.2460	4.2318	.46		1.42
157	7.702E+13	1.2503	4.2340	.45		1.42
158	7.751E+13	1.2547	4.2361	.45		1.41
159	7.800E+13	1.2592	4.2383	.45		1.40
160	7.850E+13	1.2637	4.2406	.45		1.39
161	7.899E+13	1.2683	4.2429	.44		1.39
162	7.948E+13	1.2729	4.2450	.44		1.39
163	7.997E+13	1.2776	4.2473	.44		1.37
164	8.046E+13	1.2823	4.2496	.44		1.37
165	8.095E+13	1.2871	4.2519	.44		1.36
166	8.144E+13	1.2920	4.2542	.43		1.35
167	8.193E+13	1.2970	4.2565	.43		1.35
168	8.242E+13	1.3020	4.2589	.43		1.34
169	8.291E+13	1.3070	4.2612	.43		1.33
170	8.340E+13	1.3122	4.2636	.42		1.33
171	8.389E+13	1.3174	4.2660	.42		1.32
172	8.438E+13	1.3227	4.2684	.42		1.31
173	8.487E+13	1.3280	4.2709	.42		1.31
174	8.536E+13	1.4035	4.2532	.42		1.30
175	8.585E+13	1.4090	4.2557	.41		1.29
176	8.634E+13	1.4145	4.2582	.41		1.29
177	8.683E+13	1.4202	4.2607	.41		1.28
178	8.732E+13	1.4259	4.2632	.41		1.27
179	8.781E+13	1.4317	4.2657	.41		1.27
180	8.831E+13	1.4376	4.2683	.40		1.26
181	8.880E+13	1.4436	4.2709	.40		1.26
182	8.929E+13	1.4496	4.2735	.40		1.25
183	8.978E+13	1.4558	4.2761	.40		1.24
184	9.027E+13	1.4620	4.2789	.40		1.24
185	9.076E+13	1.4683	4.2814	.39		1.23
186	9.125E+13	1.4747	4.2841	.39		1.22
187	9.174E+13	1.4811	4.2869	.39		1.22
188	9.223E+13	1.4877	4.2895	.39		1.21
189	9.272E+13	1.4943	4.2923	.39		1.21
190	9.321E+13	1.5011	4.2951	.38		1.20
191	9.370E+13	1.5079	4.2979	.38		1.19
192	9.419E+13	1.5148	4.3007	.38		1.19
193	9.468E+13	1.5218	4.3035	.38		1.18
194	9.517E+13	1.5289	4.3064	.38		1.18
195	9.566E+13	1.5361	4.3093	.37		1.17
196	9.615E+13	1.5434	4.3122	.37		1.16
197	9.665E+13	1.5508	4.3151	.37		1.16
198	9.714E+13	1.5582	4.3181	.37		1.15
199	9.763E+13	1.5659	4.3210	.37		1.15

MODEL	TIME	LOG(I/LSUN)	LOG(TEFF)	RAQUE ED	Q/PSUN
200	0.312E+13	1.5735	4.1240	.37	1.14
201	0.861E+13	1.5812	4.1271	.36	1.14
202	0.910E+13	1.5801	4.1301	.36	1.13
203	0.950E+13	1.5070	4.1332	.36	1.12
204	1.001E+14	1.6051	4.1363	.36	1.12
205	1.006E+14	1.6132	4.1394	.36	1.11
206	1.011E+14	1.6215	4.1426	.35	1.11
207	.000E+00	1.6208	4.1457	.00	.00
208	.000E+00	.0000	.0000	.00	.00
209	.000E+00	.0000	.0000	.00	.00
210	.000E+00	.0000	.0000	.00	.00
211	.000E+00	.0000	.0000	.00	.00
212	.000E+00	.0000	.0000	.00	.00
213	.000E+00	.0000	.0000	.00	.00
214	.000E+00	.0000	.0000	.00	.00
215	.000E+00	.0000	.0000	.00	.00
216	.000E+00	.0000	.0000	.00	.00
217	.000E+00	.0000	.0000	.00	.00
218	.000E+00	.0000	.0000	.00	.00
219	.000E+00	.0000	.0000	.00	.00
220	.000E+00	.0000	.0000	.00	.00
221	.000E+00	.0000	.0000	.00	.00
222	.000E+00	.0000	.0000	.00	.00
223	.000E+00	.0000	.0000	.00	.00
224	.000E+00	.0000	.0000	.00	.00
225	.000E+00	.0000	.0000	.00	.00
226	.000E+00	.0000	.0000	.00	.00
227	.000E+00	.0000	.0000	.00	.00
228	.000E+00	.0000	.0000	.00	.00
229	.000E+00	.0000	.0000	.00	.00
230	.000E+00	.0000	.0000	.00	.00
231	.000E+00	.0000	.0000	.00	.00
232	.000E+00	.0000	.0000	.00	.00
233	.000E+00	.0000	.0000	.00	.00
234	.000E+00	.0000	.0000	.00	.00
235	.000E+00	.0000	.0000	.00	.00
236	.000E+00	.0000	.0000	.00	.00
237	.000E+00	.0000	.0000	.00	.00
238	.000E+00	.0000	.0000	.00	.00
239	.000E+00	.0000	.0000	.00	.00
240	.000E+00	.0000	.0000	.00	.00
241	.000E+00	.0000	.0000	.00	.00
242	.000E+00	.0000	.0000	.00	.00
243	.000E+00	.0000	.0000	.00	.00
244	.000E+00	.0000	.0000	.00	.00
245	.000E+00	.0000	.0000	.00	.00
246	.000E+00	.0000	.0000	.00	.00
247	.000E+00	.0000	.0000	.00	.00
248	.000E+00	.0000	.0000	.00	.00
249	.000E+00	.0000	.0000	.00	.00

TABLE C-8

PREF-MAIN-SEQUENCE BINARY MODEL FOR AI DRACONIS

SECONDARY MASS = $1.03 M_{\odot}$

PERIOD = 1.199 DAYS

MODEL	TIME	LOG(L/L _{SUN})	LOG(TEMP)	POWERS	2/25/81
1	2.455E+00	2.0243	3.3775	.00	2.10
2	3.712E+00	2.0054	3.3703	.00	2.18
3	5.043E+00	2.8865	3.3800	.03	2.17
4	6.434E+00	2.8675	3.3825	.03	2.16
5	7.895E+00	2.8486	3.3842	.07	2.15
6	9.428E+00	2.8296	3.3858	.07	2.13
7	1.104E+10	2.8107	3.3874	.06	2.12
8	1.273E+10	2.7917	3.3891	.06	2.11
9	1.450E+10	2.7727	3.3907	.05	2.10
10	1.637E+10	2.7538	3.3923	.05	2.09
11	1.832E+10	2.7348	3.3940	.04	2.08
12	2.037E+10	2.7159	3.3956	.04	2.07
13	2.253E+10	2.6969	3.3972	.03	2.06
14	2.479E+10	2.6780	3.3989	.03	2.05
15	2.717E+10	2.6590	3.4005	.02	2.04
16	2.966E+10	2.6401	3.4021	.02	2.03
17	3.228E+10	2.6211	3.4033	.01	2.02
18	3.503E+10	2.6022	3.4054	.01	2.01
19	3.792E+10	2.5832	3.4070	.00	2.00
20	4.095E+10	2.5643	3.4087	.00	1.99
21	4.413E+10	2.5453	3.4103	.00	1.98
22	4.747E+10	2.5264	3.4119	.00	1.97
23	5.098E+10	2.5074	3.4136	.00	1.96
24	5.466E+10	2.4884	3.4152	.03	1.95
25	5.852E+10	2.4695	3.4168	.03	1.94
26	6.258E+10	2.4505	3.4185	.07	1.93
27	6.684E+10	2.4316	3.4201	.07	1.92
28	7.131E+10	2.4126	3.4217	.06	1.91
29	7.601E+10	2.3936	3.4234	.06	1.90
30	8.094E+10	2.3747	3.4250	.06	1.89
31	8.611E+10	2.3557	3.4266	.05	1.88
32	9.155E+10	2.3368	3.4283	.05	1.87
33	9.725E+10	2.3178	3.4299	.04	1.86
34	1.032E+11	2.2988	3.4316	.04	1.86
35	1.095E+11	2.2799	3.4332	.03	1.85
36	1.161E+11	2.2609	3.4348	.03	1.84
37	1.231E+11	2.2419	3.4365	.03	1.83
38	1.303E+11	2.2230	3.4381	.02	1.82
39	1.380E+11	2.2040	3.4397	.02	1.81
40	1.460E+11	2.1850	3.4414	.01	1.80
41	1.544E+11	2.1661	3.4430	.01	1.79
42	1.633E+11	2.1471	3.4446	.01	1.78
43	1.726E+11	2.1281	3.4463	.00	1.77
44	1.823E+11	2.1091	3.4479	.00	1.76
45	1.925E+11	2.0902	3.4495	.00	1.75
46	2.033E+11	2.0712	3.4512	.00	1.75
47	2.146E+11	2.0522	3.4528	.00	1.74
48	2.264E+11	2.0332	3.4544	.00	1.73
49	2.389E+11	2.0143	3.4561	.00	1.72

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE 50	DOSE 100
50	2.510E+11	1.0253	3.4577	.77	1.71
51	2.656E+11	1.0263	3.4504	.77	1.70
52	2.800E+11	1.0272	3.4410	.77	1.70
53	2.951E+11	1.0283	3.4326	.76	1.69
54	3.110E+11	1.0103	3.4643	.76	1.69
55	3.276E+11	1.0204	3.4650	.76	1.67
56	3.451E+11	1.0314	3.4675	.75	1.66
57	3.635E+11	1.0624	3.4602	.75	1.65
58	3.827E+11	1.0434	3.4709	.74	1.65
59	4.030E+11	1.0244	3.4724	.74	1.64
60	4.242E+11	1.0054	3.4741	.74	1.63
61	4.465E+11	1.7364	3.4757	.73	1.62
62	4.700E+11	1.7674	3.4774	.73	1.61
63	4.946E+11	1.7484	3.4700	.73	1.60
64	5.204E+11	1.7204	3.4806	.72	1.60
65	5.475E+11	1.7104	3.4823	.72	1.59
66	5.760E+11	1.6914	3.4830	.71	1.58
67	6.050E+11	1.6724	3.4856	.71	1.57
68	6.373E+11	1.6534	3.4873	.71	1.56
69	6.702E+11	1.6344	3.4888	.70	1.56
70	7.048E+11	1.6154	3.4905	.70	1.55
71	7.412E+11	1.5964	3.4921	.70	1.54
72	7.793E+11	1.5774	3.4937	.69	1.53
73	8.194E+11	1.5583	3.4954	.69	1.53
74	8.615E+11	1.5393	3.4970	.69	1.52
75	9.056E+11	1.5203	3.4987	.68	1.51
76	9.520E+11	1.5013	3.5003	.69	1.50
77	1.001E+12	1.4822	3.5019	.68	1.50
78	1.052E+12	1.4632	3.5036	.67	1.49
79	1.106E+12	1.4442	3.5052	.67	1.48
80	1.162E+12	1.4251	3.5069	.67	1.47
81	1.221E+12	1.4061	3.5085	.66	1.47
82	1.283E+12	1.3870	3.5102	.66	1.46
83	1.349E+12	1.3680	3.5118	.66	1.45
84	1.417E+12	1.3490	3.5134	.65	1.44
85	1.489E+12	1.3299	3.5151	.65	1.44
86	1.565E+12	1.3108	3.5167	.65	1.43
87	1.644E+12	1.2918	3.5184	.64	1.42
88	1.728E+12	1.2727	3.5200	.64	1.42
89	1.815E+12	1.2536	3.5217	.64	1.41
90	1.907E+12	1.2346	3.5233	.63	1.40
91	2.004E+12	1.2155	3.5249	.63	1.39
92	2.105E+12	1.1964	3.5266	.63	1.39
93	2.211E+12	1.1773	3.5282	.61	1.38
94	2.323E+12	1.1582	3.5299	.62	1.37
95	2.441E+12	1.1392	3.5315	.62	1.37
96	2.564E+12	1.1201	3.5332	.61	1.36
97	2.694E+12	1.1010	3.5348	.61	1.35
98	2.830E+12	1.0819	3.5365	.61	1.35
99	2.972E+12	1.0627	3.5381	.61	1.34

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	ROCHE FR	2/20 SUN
100	3.122E+12	1.0436	3.5308	.60	1.22
101	3.280E+12	1.0245	3.5414	.60	1.22
102	3.446E+12	1.0054	3.5431	.60	1.22
103	3.610E+12	.9862	3.5447	.59	1.21
104	3.802E+12	.9671	3.5464	.59	1.21
105	3.994E+12	.9479	3.5480	.59	1.20
106	4.105E+12	.9288	3.5497	.58	1.20
107	4.407E+12	.9096	3.5512	.58	1.20
108	4.620E+12	.8905	3.5530	.58	1.20
109	4.862E+12	.8713	3.5546	.58	1.20
110	5.107E+12	.8521	3.5563	.57	1.20
111	5.365E+12	.8329	3.5579	.57	1.26
112	5.635E+12	.8137	3.5596	.57	1.25
113	5.920E+12	.7945	3.5612	.56	1.25
114	6.218E+12	.7753	3.5629	.56	1.24
115	6.532E+12	.7561	3.5645	.56	1.24
116	6.861E+12	.7369	3.5662	.56	1.23
117	7.207E+12	.7176	3.5679	.55	1.22
118	7.570E+12	.6984	3.5695	.55	1.22
119	7.952E+12	.6791	3.5712	.55	1.21
120	8.354E+12	.6599	3.5728	.55	1.21
121	8.775E+12	.6406	3.5745	.54	1.20
122	9.218E+12	.6213	3.5762	.54	1.19
123	9.683E+12	.6020	3.5778	.54	1.19
124	1.017E+13	.5827	3.5795	.53	1.18
125	1.069E+13	.5634	3.5812	.53	1.18
126	1.123E+13	.5441	3.5828	.53	1.17
127	1.179E+13	.5247	3.5845	.53	1.16
128	1.239E+13	.5054	3.5862	.52	1.16
129	1.302E+13	.4860	3.5878	.52	1.15
130	1.367E+13	.4667	3.5895	.52	1.15
131	1.437E+13	.4473	3.5912	.52	1.14
132	1.509E+13	.4279	3.5928	.51	1.14
133	1.586E+13	.4084	3.5945	.51	1.13
134	1.666E+13	.3890	3.5962	.51	1.12
135	1.750E+13	.3696	3.5979	.51	1.12
136	1.839E+13	.3501	3.5995	.50	1.11
137	1.932E+13	.3306	3.6012	.50	1.11
138	2.030E+13	.3111	3.6029	.50	1.10
139	2.133E+13	.2916	3.6046	.50	1.10
140	2.241E+13	.2721	3.6063	.49	1.09
141	2.355E+13	.2526	3.6080	.49	1.09
142	2.475E+13	.2330	3.6096	.49	1.09
143	2.601E+13	.2134	3.6113	.49	1.07
144	2.733E+13	.1938	3.6129	.48	1.07
145	2.872E+13	.1742	3.6147	.48	1.06
146	3.018E+13	.1546	3.6164	.48	1.06
147	3.172E+13	.1349	3.6181	.48	1.05
148	3.334E+13	.1152	3.6198	.47	1.05
149	3.504E+13	.0955	3.6215	.47	1.04

MODEL	TIME	LOG(M/ALIN)	LOG(TEMP)	DOUGH FR	2/2DSUM
150	3.493E+13	.0759	3.5232	.47	1.04
151	3.371E+13	.0560	3.5242	.47	1.03
152	4.060E+13	.0363	3.5266	.46	1.02
153	4.277E+13	.0165	3.5293	.46	1.02
154	4.406E+13	-.0034	3.5300	.46	1.02
155	4.726E+13	-.0232	3.5317	.46	1.01
156	4.060E+13	-.0431	3.5334	.46	1.01
157	5.224E+13	-.0630	3.5352	.45	1.00
158	5.402E+13	-.0829	3.5369	.45	1.00
159	5.774E+13	-.1029	3.5386	.45	.99
160	6.071E+13	-.1229	3.5403	.45	.99
161	6.394E+13	-.1422	3.5420	.44	.98
162	6.713E+13	-.1630	3.5439	.44	.98
163	7.060E+13	-.1831	3.5455	.44	.97
164	7.424E+13	-.2032	3.5472	.44	.97
165	7.808E+13	-.2234	3.5490	.44	.96
166	8.309E+13	-.2425	3.5507	.43	.96
167	9.811E+13	-.2609	3.5525	.43	.95
168	9.312E+13	-.2672	3.5542	.43	.95
169	9.313E+13	-.2646	3.5560	.42	.94
170	1.031E+14	-.2612	3.5577	.42	.94
171	1.082E+14	-.2502	3.5595	.42	.93
172	1.122E+14	-.2565	3.5612	.42	.93
173	1.182E+14	-.2539	3.5630	.42	.92
174	1.232E+14	-.2511	3.5648	.42	.92
175	1.292E+14	-.2493	3.5665	.41	.92
176	1.332E+14	-.2456	3.5683	.41	.91
177	1.382E+14	-.2429	3.5701	.41	.91
178	1.433E+14	-.2400	3.5719	.41	.90
179	1.483E+14	-.2372	3.5737	.41	.90
180	1.533E+14	-.2344	3.5755	.40	.89
181	1.583E+14	-.2315	3.5773	.40	.89
182	1.633E+14	-.2287	3.5791	.40	.88
183	1.683E+14	-.2259	3.5909	.40	.88
184	1.733E+14	-.2229	3.5927	.40	.87
185	1.784E+14	-.2200	3.5945	.39	.87
186	1.834E+14	-.2170	3.5964	.39	.87
187	1.884E+14	-.2140	3.5982	.39	.86
188	1.934E+14	-.2110	3.6000	.39	.86
189	1.984E+14	-.2080	3.6019	.39	.85
190	2.034E+14	-.2050	3.6037	.38	.85
191	2.084E+14	-.2019	3.6056	.38	.84
192	2.134E+14	-.2000	3.6074	.38	.84
193	2.185E+14	-.2057	3.6093	.38	.84
194	2.235E+14	-.2026	3.7012	.37	.83
195	2.285E+14	-.2004	3.7031	.37	.83
196	2.335E+14	-.2032	3.7049	.37	.82
197	2.385E+14	-.2030	3.7068	.37	.82
198	2.435E+14	-.2037	3.7087	.37	.82
199	2.485E+14	-.2064	3.7106	.37	.81

MODEL	TIME	LOG(M/ALUM)	LOG(TREE)	POUCH	SB	D/ALUM
200	2.536E+14	- .3731	3.7126	.37		.31
201	2.586E+14	- .3608	3.7145	.36		.30
202	2.636E+14	- .3664	3.7164	.36		.30
203	2.686E+14	- .3630	3.7184	.36		.30
204	2.736E+14	- .3595	3.7203	.36		.70
205	2.786E+14	- .3560	3.7223	.36		.70
206	2.836E+14	- .3525	3.7242	.35		.78
207	.000E+00	.0000	.0000	.00		.00
208	.000E+00	.0000	.0000	.00		.00
209	.000E+00	.0000	.0000	.00		.00
210	.000E+00	.0000	.0000	.00		.00
211	.000E+00	.0000	.0000	.00		.00
212	.000E+00	.0000	.0000	.00		.00
213	.000E+00	.0000	.0000	.00		.00
214	.000E+00	.0000	.0000	.00		.00
215	.000E+00	.0000	.0000	.00		.00
216	.000E+00	.0000	.0000	.00		.00
217	.000E+00	.0000	.0000	.00		.00
218	.000E+00	.0000	.0000	.00		.00
219	.000E+00	.0000	.0000	.00		.00
220	.000E+00	.0000	.0000	.00		.00
221	.000E+00	.0000	.0000	.00		.00
222	.000E+00	.0000	.0000	.00		.00
223	.000E+00	.0000	.0000	.00		.00
224	.000E+00	.0000	.0000	.00		.00
225	.000E+00	.0000	.0000	.00		.00
226	.000E+00	.0000	.0000	.00		.00
227	.000E+00	.0000	.0000	.00		.00
228	.000E+00	.0000	.0000	.00		.00
229	.000E+00	.0000	.0000	.00		.00
230	.000E+00	.0000	.0000	.00		.00
231	.000E+00	.0000	.0000	.00		.00
232	.000E+00	.0000	.0000	.00		.00
233	.000E+00	.0000	.0000	.00		.00
234	.000E+00	.0000	.0000	.00		.00
235	.000E+00	.0000	.0000	.00		.00
236	.000E+00	.0000	.0000	.00		.00
237	.000E+00	.0000	.0000	.00		.00
238	.000E+00	.0000	.0000	.00		.00
239	.000E+00	.0000	.0000	.00		.00
240	.000E+00	.0000	.0000	.00		.00
241	.000E+00	.0000	.0000	.00		.00
242	.000E+00	.0000	.0000	.00		.00
243	.000E+00	.0000	.0000	.00		.00
244	.000E+00	.0000	.0000	.00		.00
245	.000E+00	.0000	.0000	.00		.00
246	.000E+00	.0000	.0000	.00		.00
247	.000E+00	.0000	.0000	.00		.00
248	.000E+00	.0000	.0000	.00		.00
249	.000E+00	.0000	.0000	.00		.00

TABLE C-9

PRE-MAIN-SEQUENCE BINARY MODEL FOR δ LIBRAE

PRIMARY MASS = 2.96 $M_{\odot}$

PERIOD = 2.327 DAYS

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	ROQUE EP	R/R SUN
1	1.001E+11	1.3306	3.7226	.00	5.36
2	3.802E+11	1.3418	3.7312	.00	5.34
3	5.702E+11	1.3430	3.7323	.03	5.31
4	7.604E+11	1.3461	3.7345	.03	5.29
5	9.505E+11	1.3493	3.7361	.07	5.26
6	1.141E+12	1.3505	3.7377	.07	5.23
7	1.331E+12	1.3527	3.7394	.06	5.20
8	1.521E+12	1.3548	3.7410	.06	5.18
9	1.711E+12	1.3570	3.7426	.05	5.15
10	1.901E+12	1.3592	3.7443	.05	5.13
11	2.091E+12	1.3614	3.7459	.04	5.10
12	2.281E+12	1.3636	3.7475	.04	5.08
13	2.471E+12	1.3657	3.7490	.03	5.05
14	2.661E+12	1.3679	3.7508	.03	5.02
15	2.851E+12	1.3701	3.7524	.02	5.00
16	3.041E+12	1.3723	3.7541	.02	4.97
17	3.232E+12	1.3744	3.7557	.01	4.95
18	3.422E+12	1.3766	3.7573	.01	4.92
19	3.612E+12	1.3788	3.7590	.00	4.90
20	3.802E+12	1.3810	3.7606	.00	4.89
21	3.992E+12	1.3832	3.7622	.00	4.85
22	4.182E+12	1.3853	3.7639	.00	4.83
23	4.372E+12	1.3875	3.7655	.00	4.80
24	4.562E+12	1.3897	3.7671	.03	4.78
25	4.752E+12	1.3919	3.7688	.08	4.76
26	4.942E+12	1.3941	3.7704	.87	4.73
27	5.132E+12	1.3962	3.7720	.87	4.71
28	5.323E+12	1.3984	3.7737	.86	4.69
29	5.513E+12	1.4006	3.7753	.86	4.66
30	5.703E+12	1.4028	3.7769	.86	4.64
31	5.893E+12	1.4050	3.7786	.85	4.61
32	6.083E+12	1.4071	3.7802	.85	4.59
33	6.273E+12	1.4093	3.7818	.84	4.57
34	6.463E+12	1.4115	3.7835	.84	4.55
35	6.653E+12	1.4137	3.7851	.83	4.52
36	6.843E+12	1.4159	3.7867	.83	4.50
37	7.033E+12	1.4181	3.7884	.83	4.48
38	7.223E+12	1.4202	3.7900	.82	4.46
39	7.413E+12	1.4224	3.7916	.82	4.43
40	7.604E+12	1.4246	3.7933	.81	4.41
41	7.794E+12	1.4268	3.7949	.81	4.39
42	7.984E+12	1.4290	3.7965	.81	4.37
43	8.174E+12	1.4311	3.7982	.80	4.34
44	8.364E+12	1.4332	3.7998	.80	4.32
45	8.554E+12	1.4355	3.8014	.79	4.30
46	8.744E+12	1.4377	3.8031	.79	4.28
47	8.934E+12	1.4399	3.8047	.79	4.26
48	9.124E+12	1.4421	3.8063	.78	4.24
49	9.314E+12	1.4442	3.8080	.78	4.22

MODEL	TIME	LOG(L/LSUN)	LOG(TEMP)	POCUT 50	POCUTIN
50	0.504E+12	1.4164	3.3026	.77	4.12
51	0.604E+12	1.4486	3.3112	.77	4.17
52	0.384E+12	1.4509	3.3122	.77	4.15
53	1.007E+13	1.4530	3.3145	.76	4.13
54	1.026E+13	1.4552	3.3161	.76	4.11
55	1.045E+13	1.4573	3.3179	.76	4.09
56	1.064E+13	1.4595	3.3194	.75	4.07
57	1.083E+13	1.4617	3.3211	.75	4.05
58	1.102E+13	1.4639	3.3227	.74	4.03
59	1.122E+13	1.4661	3.3242	.74	4.01
60	1.141E+13	1.4683	3.3260	.74	3.99
61	1.160E+13	1.4704	3.3276	.73	3.97
62	1.179E+13	1.4726	3.3292	.73	3.95
63	1.198E+13	1.4748	3.3309	.73	3.93
64	1.217E+13	1.4770	3.3325	.72	3.91
65	1.236E+13	1.4792	3.3341	.72	3.89
66	1.255E+13	1.4814	3.3358	.71	3.87
67	1.274E+13	1.4836	3.3374	.71	3.85
68	1.293E+13	1.4857	3.3390	.71	3.83
69	1.312E+13	1.4879	3.3407	.70	3.81
70	1.331E+13	1.4901	3.3422	.70	3.79
71	1.350E+13	1.4923	3.3439	.70	3.78
72	1.369E+13	1.4945	3.3456	.69	3.76
73	1.388E+13	1.4967	3.3472	.69	3.74
74	1.407E+13	1.4989	3.3489	.69	3.72
75	1.426E+13	1.5010	3.3505	.68	3.70
76	1.445E+13	1.5032	3.3521	.68	3.68
77	1.464E+13	1.5054	3.3538	.68	3.66
78	1.483E+13	1.5076	3.3554	.67	3.65
79	1.502E+13	1.5098	3.3570	.67	3.63
80	1.521E+13	1.5120	3.3587	.67	3.61
81	1.540E+13	1.5142	3.3603	.66	3.59
82	1.559E+13	1.5164	3.3619	.66	3.57
83	1.578E+13	1.5186	3.3636	.66	3.56
84	1.597E+13	1.5208	3.3652	.65	3.54
85	1.616E+13	1.5230	3.3668	.65	3.52
86	1.635E+13	1.5251	3.3685	.65	3.50
87	1.654E+13	1.5273	3.3701	.64	3.48
88	1.673E+13	1.5295	3.3718	.64	3.47
89	1.692E+13	1.5317	3.3734	.64	3.45
90	1.711E+13	1.5339	3.3750	.63	3.43
91	1.730E+13	1.5361	3.3767	.63	3.42
92	1.749E+13	1.5383	3.3783	.62	3.40
93	1.768E+13	1.5405	3.3799	.62	3.38
94	1.787E+13	1.5427	3.3816	.62	3.36
95	1.806E+13	1.5449	3.3832	.62	3.35
96	1.825E+13	1.5471	3.3849	.61	3.33
97	1.844E+13	1.5493	3.3865	.61	3.31
98	1.863E+13	1.5515	3.3881	.61	3.30
99	1.882E+13	1.5537	3.3897	.61	3.29

MODEL	TIME	LOG(L/L _{SUN})	LOG(TEMP)	ROCHE FR	W/DSUN
100	1.001E+13	1.5550	3.3014	.60	2.26
101	1.020E+13	1.5581	3.3030	.60	2.25
102	1.032E+13	1.5603	3.3047	.60	2.23
103	1.058E+13	1.5625	3.3063	.50	2.22
104	1.077E+13	1.5647	3.3080	.50	2.20
105	1.006E+13	1.5660	3.3006	.50	2.18
106	2.015E+13	1.5691	3.2012	.53	3.17
107	2.034E+13	1.5713	3.2020	.53	3.15
108	2.053E+13	1.5735	3.2045	.53	3.14
109	2.072E+13	1.5757	3.2062	.53	3.12
110	2.091E+13	1.5770	3.2078	.57	3.11
111	2.110E+13	1.5801	3.2004	.57	2.09
112	2.129E+13	1.5824	3.2111	.57	3.07
113	2.148E+13	1.5846	3.2127	.56	2.06
114	2.167E+13	1.5868	3.2144	.56	3.04
115	2.186E+13	1.5890	3.2160	.56	3.03
116	2.205E+13	1.5912	3.2176	.56	3.01
117	2.224E+13	1.5934	3.2193	.55	3.00
118	2.243E+13	1.5956	3.2200	.55	2.98
119	2.262E+13	1.5970	3.2226	.55	2.97
120	2.281E+13	1.6001	3.2242	.55	2.95
121	2.300E+13	1.6023	3.2250	.54	2.94
122	2.319E+13	1.6045	3.2275	.54	2.92
123	2.338E+13	1.6067	3.2291	.54	2.91
124	2.357E+13	1.6090	3.2308	.53	2.89
125	2.376E+13	1.6112	3.2324	.53	2.88
126	2.395E+13	1.6134	3.2341	.53	2.87
127	2.414E+13	1.6156	3.2357	.53	2.85
128	2.433E+13	1.6179	3.2374	.52	2.84
129	2.452E+13	1.6201	3.2390	.52	2.82
130	2.471E+13	1.6223	3.2407	.52	2.81
131	2.490E+13	1.6246	3.2423	.52	2.80
132	2.509E+13	1.6268	3.2440	.51	2.78
133	2.528E+13	1.6291	3.2456	.51	2.77
134	2.547E+13	1.6313	3.2473	.51	2.75
135	2.566E+13	1.6335	3.2489	.51	2.74
136	2.585E+13	1.6358	3.2506	.50	2.73
137	2.604E+13	1.6380	3.2522	.50	2.71
138	2.623E+13	1.6403	3.2539	.50	2.70
139	2.642E+13	1.6425	3.2555	.50	2.69
140	2.661E+13	1.6448	3.2572	.49	2.67
141	2.680E+13	1.6470	3.2589	.49	2.66
142	2.699E+13	1.6493	3.2605	.49	2.65
143	2.718E+13	1.6515	3.2621	.49	2.63
144	2.737E+13	1.6538	3.2638	.49	2.62
145	2.756E+13	1.6561	3.2654	.48	2.61
146	2.775E+13	1.6583	3.2671	.48	2.59
147	2.794E+13	1.6606	3.2687	.48	2.58
148	2.813E+13	1.6629	3.2704	.47	2.57
149	2.832E+13	1.6652	3.2721	.47	2.55

MODEL	TIME	LOG(L/LSIN)	LOG(TEFF)	POQUE 52	2495IN
150	2.251E+12	1.6674	3.0737	.47	2.54
151	2.270E+12	1.6607	3.0754	.47	2.53
152	2.280E+12	1.6720	3.0770	.46	2.52
153	2.009E+13	1.6743	3.0787	.46	2.50
154	2.227E+12	1.6766	3.0804	.46	2.49
155	2.246E+12	1.6780	3.0820	.46	2.48
156	2.265E+12	1.6812	3.0837	.46	2.47
157	2.284E+12	1.6835	3.0853	.45	2.45
158	3.003E+12	1.6858	3.0870	.45	2.44
159	2.022E+12	1.6881	3.0887	.45	2.43
160	3.041E+12	1.6904	3.0903	.45	2.42
161	3.260E+12	1.6927	3.0920	.44	2.40
162	3.070E+12	1.6951	3.0937	.44	2.39
163	3.098E+12	1.6974	3.0953	.44	2.38
164	3.117E+12	1.6997	3.0970	.44	2.37
165	3.136E+12	1.7021	3.0987	.44	2.36
166	3.155E+12	1.7044	4.0004	.43	2.35
167	3.174E+12	1.7067	4.0020	.43	2.33
168	3.193E+12	1.7091	4.0037	.43	2.32
169	3.212E+12	1.7114	4.0054	.43	2.31
170	3.231E+12	1.7138	4.0071	.42	2.30
171	3.250E+12	1.7162	4.0087	.42	2.29
172	3.269E+12	1.7185	4.0104	.42	2.28
173	3.288E+12	1.7209	4.0121	.42	2.26
174	3.307E+12	1.7233	4.0138	.42	2.25
175	3.326E+12	1.7257	4.0155	.41	2.24
176	3.345E+12	1.7281	4.0172	.41	2.23
177	3.364E+12	1.7305	4.0189	.41	2.22
178	3.383E+12	1.7329	4.0206	.41	2.21
179	3.402E+12	1.7353	4.0223	.41	2.20
180	3.421E+12	1.7378	4.0239	.40	2.19
181	3.440E+12	1.7402	4.0256	.40	2.18
182	3.459E+12	1.7426	4.0273	.40	2.16
183	3.478E+12	1.7451	4.0290	.40	2.15
184	3.497E+12	1.7475	4.0307	.40	2.14
185	3.516E+12	1.7500	4.0324	.39	2.13
186	3.535E+12	1.7525	4.0342	.39	2.12
187	3.554E+12	1.7549	4.0359	.39	2.11
188	3.573E+12	1.7574	4.0376	.39	2.10
189	3.592E+12	1.7599	4.0393	.39	2.09
190	3.611E+12	1.7624	4.0410	.38	2.08
191	3.630E+12	1.7650	4.0427	.38	2.07
192	3.649E+12	1.7675	4.0444	.38	2.06
193	3.668E+12	1.7700	4.0462	.38	2.05
194	3.687E+12	1.7726	4.0479	.38	2.04
195	3.706E+12	1.7751	4.0496	.37	2.02
196	3.725E+12	1.7777	4.0514	.37	2.02
197	3.744E+12	1.7803	4.0531	.37	2.01
198	3.763E+12	1.7829	4.0549	.37	2.00
199	3.782E+12	1.7855	4.0566	.37	1.99

MODEI	TIME	LOG(L/LSUN)	LOG(TEMP)	ROCHE	ED	2/BSUM
200	3.801E+13	1.7281	4.0522	.27		1.02
201	3.820E+13	1.7202	4.0601	.26		1.07
202	3.830E+13	1.7234	4.0612	.26		1.06
203	3.858E+13	1.7261	4.0636	.26		1.05
204	3.877E+13	1.7288	4.0653	.26		1.04
205	3.896E+13	1.8014	4.0671	.26		1.02
206	3.915E+13	1.8041	4.0682	.25		1.02
207	3.934E+13	1.8069	4.0706	.35		1.01
208	3.952E+13	1.8096	4.0724	.25		1.00
209	3.972E+13	1.8124	4.0742	.35		1.89
210	3.991E+13	1.8151	4.0759	.25		1.88
211	4.010E+13	1.8179	4.0777	.35		1.87
212	4.028E+13	1.8207	4.0795	.24		1.86
213	4.048E+13	1.8235	4.0812	.24		1.85
214	4.067E+13	1.8264	4.0831	.24		1.84
215	4.086E+13	1.8293	4.0849	.24		1.82
216	4.105E+13	1.8321	4.0867	.24		1.83
217	4.124E+13	1.8350	4.0885	.24		1.82
218	4.142E+13	1.8380	4.0904	.23		1.81
219	4.162E+13	1.8409	4.0922	.23		1.80
220	4.181E+13	1.8439	4.0940	.23		1.79
221	4.200E+13	1.8469	4.0959	.23		1.78
222	4.219E+13	1.8499	4.0977	.23		1.77
223	4.238E+13	1.8529	4.0995	.23		1.76
224	4.257E+13	1.8560	4.1014	.22		1.75
225	4.276E+13	1.8590	4.1032	.22		1.74
226	4.295E+13	1.8622	4.1051	.22		1.74
227	4.314E+13	1.8653	4.1070	.22		1.73
228	4.333E+13	1.8685	4.1089	.22		1.72
229	4.352E+13	1.8716	4.1108	.22		1.71
230	4.371E+13	1.8749	4.1126	.21		1.70
231	4.390E+13	1.8781	4.1145	.21		1.69
232	4.409E+13	1.8814	4.1165	.21		1.68
233	4.428E+13	1.8847	4.1184	.21		1.68
234	4.447E+13	1.8880	4.1203	.21		1.67
235	4.466E+13	1.8914	4.1222	.21		1.66
236	4.485E+13	1.8948	4.1242	.20		1.65
237	4.504E+13	1.8983	4.1261	.20		1.64
238	4.523E+13	1.9017	4.1281	.20		1.63
239	4.542E+13	1.9053	4.1300	.20		1.63
240	4.561E+13	1.9088	4.1320	.20		1.62
241	4.580E+13	1.9124	4.1340	.20		1.61
242	4.599E+13	1.9160	4.1360	.20		1.60
243	4.617E+13	1.9197	4.1380	.20		1.59
244	4.637E+13	1.9234	4.1400	.20		1.59
245	4.656E+13	1.9271	4.1420	.20		1.58
246	4.675E+13	1.9309	4.1441	.20		1.58
247	4.694E+13	1.9347	4.1461	.20		1.56
248	4.713E+13	1.9386	4.1482	.20		1.55
249	4.732E+13	1.9425	4.1502	.20		1.55

TABLE C-10

PRE-MAIN-SEQUENCE BINARY MODEL FOR δ LIBRAE

SECONDARY MASS = $1.31 M_{\odot}$

PERIOD = 2.327 DAYS

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	POURCE FR	RADIIUM
1	2.507E+03	3.8940	3.3417	.00	2.49
2	3.030E+03	3.8950	3.3422	.00	2.45
3	5.331E+03	3.8941	3.3450	.02	2.44
4	6.800E+03	3.8972	3.3466	.03	2.42
5	8.343E+03	3.8982	3.3482	.07	2.41
6	9.063E+03	3.7903	3.3400	.07	2.50
7	1.164E+04	3.7703	3.3515	.06	2.57
8	1.345E+04	3.7514	3.3531	.06	2.55
9	1.532E+04	3.7325	3.3548	.05	2.53
10	1.720E+04	3.7135	3.3564	.05	2.52
11	1.936E+04	3.6946	3.3580	.04	2.50
12	2.153E+04	3.6756	3.3597	.04	2.48
13	2.380E+04	3.6567	3.3613	.03	2.46
14	2.610E+04	3.6379	3.3629	.03	2.45
15	2.870E+04	3.6188	3.3646	.02	2.43
16	3.134E+04	3.5990	3.3662	.02	2.41
17	3.410E+04	3.5790	3.3678	.01	2.39
18	3.700E+04	3.5600	3.3695	.01	2.38
19	4.005E+04	3.5431	3.3711	.00	2.36
20	4.325E+04	3.5241	3.3727	.00	2.34
21	4.661E+04	3.5052	3.3744	.00	2.32
22	5.014E+04	3.4862	3.3760	.00	2.31
23	5.384E+04	3.4672	3.3776	.00	2.29
24	5.773E+04	3.4484	3.3792	.00	2.29
25	6.181E+04	3.4294	3.3809	.00	2.26
26	6.609E+04	3.4105	3.3825	.07	2.25
27	7.050E+04	3.3915	3.3842	.07	2.23
28	7.531E+04	3.3726	3.3858	.06	2.21
29	8.027E+04	3.3536	3.3874	.06	2.20
30	8.547E+04	3.3347	3.3891	.06	2.18
31	9.093E+04	3.3158	3.3907	.05	2.16
32	9.667E+04	3.2968	3.3923	.05	2.15
33	1.027E+05	3.2779	3.3940	.04	2.13
34	1.090E+05	3.2589	3.3956	.04	2.12
35	1.156E+05	3.2400	3.3972	.03	2.10
36	1.226E+05	3.2211	3.3989	.03	2.09
37	1.299E+05	3.2021	3.4005	.03	2.07
38	1.376E+05	3.1832	3.4021	.02	2.06
39	1.457E+05	3.1642	3.4038	.02	2.04
40	1.541E+05	3.1452	3.4054	.01	2.03
41	1.630E+05	3.1263	3.4070	.01	2.01
42	1.723E+05	3.1074	3.4087	.01	2.00
43	1.821E+05	3.0885	3.4103	.00	2.00
44	1.924E+05	3.0696	3.4119	.00	2.00
45	2.032E+05	3.0506	3.4136	.00	2.00
46	2.145E+05	3.0316	3.4152	.00	2.00
47	2.264E+05	3.0127	3.4169	.00	2.00
48	2.389E+05	2.9938	3.4185	.00	2.01
49	2.520E+05	2.9749	3.4201	.00	2.00

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	POUR 50	POUR 50
50	2.458E+10	2.0550	3.4217	.77	2.82
51	2.302E+10	2.0360	3.4234	.77	2.86
52	2.054E+10	2.0180	3.4050	.77	2.85
53	3.112E+10	2.0200	3.4266	.76	2.82
54	3.230E+10	2.9301	3.4223	.76	2.82
55	3.456E+10	2.8612	3.4222	.76	2.81
56	3.640E+10	2.8422	3.4315	.75	2.79
57	3.833E+10	2.8233	3.4322	.75	2.72
58	4.036E+10	2.8043	3.4348	.74	2.76
59	4.250E+10	2.7854	3.4364	.74	2.75
60	4.473E+10	2.7665	3.4381	.74	2.74
61	4.708E+10	2.7475	3.4397	.73	2.72
62	4.955E+10	2.7286	3.4413	.73	2.71
63	5.214E+10	2.7096	3.4430	.72	2.70
64	5.486E+10	2.6907	3.4446	.72	2.62
65	5.771E+10	2.6717	3.4462	.72	2.67
66	6.071E+10	2.6528	3.4479	.71	2.66
67	6.385E+10	2.6339	3.4495	.71	2.64
68	6.716E+10	2.6149	3.4511	.71	2.63
69	7.062E+10	2.5960	3.4527	.70	2.62
70	7.426E+10	2.5770	3.4544	.70	2.60
71	7.808E+10	2.5581	3.4560	.70	2.59
72	8.210E+10	2.5391	3.4576	.69	2.58
73	8.631E+10	2.5202	3.4593	.69	2.56
74	9.073E+10	2.5012	3.4609	.69	2.55
75	9.537E+10	2.4823	3.4625	.68	2.54
76	1.002E+11	2.4634	3.4642	.68	2.53
77	1.054E+11	2.4444	3.4658	.68	2.51
78	1.107E+11	2.4255	3.4674	.67	2.50
79	1.164E+11	2.4065	3.4691	.67	2.49
80	1.223E+11	2.3876	3.4707	.67	2.48
81	1.285E+11	2.3686	3.4723	.66	2.46
82	1.350E+11	2.3497	3.4740	.66	2.45
83	1.419E+11	2.3307	3.4756	.66	2.44
84	1.491E+11	2.3118	3.4772	.65	2.43
85	1.566E+11	2.2928	3.4789	.65	2.41
86	1.645E+11	2.2739	3.4805	.65	2.40
87	1.729E+11	2.2550	3.4821	.64	2.39
88	1.816E+11	2.2360	3.4838	.64	2.38
89	1.908E+11	2.2171	3.4854	.64	2.37
90	2.004E+11	2.1981	3.4870	.63	2.35
91	2.105E+11	2.1792	3.4887	.63	2.34
92	2.211E+11	2.1602	3.4903	.62	2.32
93	2.322E+11	2.1413	3.4919	.62	2.32
94	2.439E+11	2.1223	3.4936	.62	2.31
95	2.562E+11	2.1034	3.4952	.62	2.30
96	2.691E+11	2.0844	3.4968	.61	2.28
97	2.826E+11	2.0655	3.4985	.61	2.27
98	2.969E+11	2.0465	3.5001	.61	2.26
99	3.118E+11	2.0276	3.5017	.61	2.25

MODEI	TIME	LOG(L/L SUN)	LOG(TEMP)	ROCHE	ED	D/D SUN
100	3.274E+11	2.0096	3.5034	.60		2.24
101	3.430E+11	1.9397	3.5050	.60		2.23
102	3.611E+11	1.9707	3.5066	.60		2.22
103	3.792E+11	1.9518	3.5082	.59		2.21
104	3.983E+11	1.9328	3.5099	.59		2.19
105	4.182E+11	1.9139	3.5115	.59		2.18
106	4.392E+11	1.8949	3.5132	.58		2.17
107	4.612E+11	1.8760	3.5148	.58		2.16
108	4.843E+11	1.8570	3.5165	.58		2.15
109	5.086E+11	1.8381	3.5181	.58		2.14
110	5.340E+11	1.8191	3.5197	.57		2.13
111	5.608E+11	1.8002	3.5214	.57		2.12
112	5.889E+11	1.7812	3.5230	.57		2.11
113	6.183E+11	1.7623	3.5246	.56		2.10
114	6.493E+11	1.7433	3.5263	.56		2.09
115	6.818E+11	1.7243	3.5279	.56		2.08
116	7.159E+11	1.7054	3.5295	.56		2.07
117	7.517E+11	1.6864	3.5312	.55		2.06
118	7.893E+11	1.6675	3.5328	.55		2.05
119	8.287E+11	1.6485	3.5344	.55		2.04
120	8.702E+11	1.6296	3.5361	.55		2.03
121	9.137E+11	1.6106	3.5377	.54		2.02
122	9.593E+11	1.5916	3.5393	.54		2.01
123	1.007E+12	1.5727	3.5410	.54		2.00
124	1.059E+12	1.5537	3.5426	.53		1.99
125	1.110E+12	1.5348	3.5442	.53		1.98
126	1.166E+12	1.5158	3.5459	.53		1.97
127	1.224E+12	1.4968	3.5475	.53		1.96
128	1.285E+12	1.4779	3.5491	.52		1.95
129	1.350E+12	1.4589	3.5508	.52		1.94
130	1.417E+12	1.4400	3.5524	.52		1.93
131	1.488E+12	1.4210	3.5540	.52		1.92
132	1.562E+12	1.4020	3.5557	.51		1.91
133	1.640E+12	1.3831	3.5573	.51		1.90
134	1.722E+12	1.3641	3.5589	.51		1.89
135	1.808E+12	1.3451	3.5606	.51		1.88
136	1.898E+12	1.3262	3.5622	.50		1.87
137	1.993E+12	1.3072	3.5639	.50		1.86
138	2.093E+12	1.2882	3.5655	.50		1.85
139	2.197E+12	1.2692	3.5671	.50		1.84
140	2.307E+12	1.2503	3.5688	.49		1.83
141	2.422E+12	1.2313	3.5704	.49		1.82
142	2.543E+12	1.2123	3.5720	.49		1.81
143	2.670E+12	1.1933	3.5737	.49		1.81
144	2.803E+12	1.1744	3.5753	.49		1.80
145	2.943E+12	1.1554	3.5769	.48		1.79
146	3.090E+12	1.1364	3.5785	.48		1.78
147	3.244E+12	1.1174	3.5802	.48		1.77
148	3.406E+12	1.0984	3.5818	.47		1.76
149	3.576E+12	1.0795	3.5835	.47		1.75

MODE	TIME	LOG(L/L SUN)	LOG(TEMP)	ROCHE FR	2/25/11
150	3.755E+12	1.0605	3.5351	.47	1.74
151	3.042E+12	1.0115	3.5269	.47	1.72
152	4.130E+12	1.0225	3.5384	.46	1.72
153	4.346E+12	1.0035	3.5000	.46	1.72
154	4.562E+12	.9345	3.5017	.46	1.71
155	4.700E+12	.9655	3.5033	.46	1.70
156	5.030E+12	.9465	3.5040	.46	1.69
157	5.281E+12	.9276	3.5066	.45	1.69
159	5.544E+12	.9086	3.5082	.45	1.67
150	5.321E+12	.8906	3.5090	.45	1.67
160	6.112E+12	.8706	3.6015	.45	1.66
161	6.417E+12	.8516	3.6031	.44	1.65
162	6.737E+12	.8326	3.6048	.44	1.64
163	7.074E+12	.8135	3.6064	.44	1.63
164	7.427E+12	.7945	3.6080	.44	1.62
165	7.798E+12	.7755	3.6097	.44	1.62
166	8.188E+12	.7565	3.6113	.43	1.61
167	8.597E+12	.7375	3.6130	.43	1.60
168	9.026E+12	.7185	3.6146	.43	1.59
169	9.477E+12	.6995	3.6162	.43	1.58
170	9.950E+12	.6805	3.6179	.42	1.58
171	1.045E+13	.6614	3.6195	.42	1.57
172	1.097E+13	.6424	3.6212	.42	1.56
173	1.152E+13	.6234	3.6229	.42	1.55
174	1.209E+13	.6042	3.6244	.42	1.55
175	1.270E+13	.5853	3.6261	.41	1.54
176	1.333E+13	.5663	3.6277	.41	1.53
177	1.400E+13	.5472	3.6294	.41	1.52
178	1.470E+13	.5282	3.6310	.41	1.51
179	1.543E+13	.5091	3.6326	.41	1.51
180	1.620E+13	.4901	3.6343	.40	1.50
181	1.701E+13	.4710	3.6359	.40	1.49
192	1.787E+13	.4520	3.6376	.40	1.48
183	1.876E+13	.4329	3.6392	.40	1.48
184	1.970E+13	.4139	3.6409	.40	1.47
185	2.068E+13	.3948	3.6425	.39	1.46
186	2.172E+13	.3757	3.6441	.39	1.46
187	2.280E+13	.3567	3.6458	.39	1.45
188	2.394E+13	.3376	3.6474	.39	1.44
189	2.514E+13	.3185	3.6491	.39	1.43
190	2.752E+13	-.1262	3.6507	.38	1.43
191	2.990E+13	-.1239	3.6524	.38	1.42
192	3.228E+13	-.1217	3.6540	.38	1.41
193	3.466E+13	-.1195	3.6557	.38	1.40
194	3.704E+13	-.1172	3.6573	.38	1.40
195	3.942E+13	-.1150	3.6590	.37	1.39
196	4.180E+13	-.1128	3.6606	.37	1.39
197	4.418E+13	-.1105	3.6623	.37	1.38
198	4.655E+13	-.1082	3.6639	.37	1.37
199	4.893E+13	-.1060	3.6656	.37	1.36

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	POURCE	SD	POURCE
200	5.131E+13	-.1030	3.6672	.37		1.36
201	5.360E+13	-.1015	3.6680	.36		1.35
202	5.607E+13	-.0993	3.6705	.36		1.34
203	5.845E+13	-.0970	3.6722	.36		1.34
204	6.083E+13	-.0948	3.6739	.36		1.33
205	6.321E+13	-.0925	3.6755	.36		1.32
206	6.550E+13	-.0903	3.6771	.35		1.32
207	6.706E+13	-.0880	3.6788	.35		1.31
208	7.034E+13	-.0857	3.6804	.35		1.30
209	7.272E+13	-.0835	3.6821	.35		1.30
210	7.510E+13	-.0812	3.6837	.35		1.29
211	7.748E+13	-.0789	3.6854	.35		1.28
212	7.986E+13	-.0767	3.6870	.34		1.28
213	8.224E+13	-.0744	3.6887	.34		1.27
214	8.462E+13	-.0721	3.6904	.34		1.26
215	8.700E+13	-.0698	3.6920	.34		1.26
216	8.938E+13	-.0675	3.6937	.34		1.25
217	9.175E+13	-.0652	3.6953	.34		1.25
218	9.413E+13	-.0629	3.6970	.33		1.24
219	9.651E+13	-.0606	3.6987	.33		1.23
220	9.889E+13	-.0583	3.7002	.33		1.23
221	1.013E+14	-.0560	3.7020	.33		1.22
222	1.036E+14	-.0537	3.7037	.33		1.21
223	1.060E+14	-.0514	3.7053	.33		1.21
224	1.084E+14	-.0491	3.7070	.32		1.20
225	1.108E+14	-.0468	3.7087	.32		1.20
226	1.132E+14	-.0444	3.7103	.32		1.19
227	1.155E+14	-.0421	3.7120	.32		1.18
228	1.179E+14	-.0398	3.7137	.32		1.18
229	1.203E+14	-.0374	3.7154	.32		1.17
230	1.227E+14	-.0351	3.7170	.31		1.17
231	1.251E+14	-.0327	3.7187	.31		1.16
232	1.274E+14	-.0304	3.7204	.31		1.16
233	1.298E+14	-.0280	3.7221	.31		1.15
234	1.322E+14	-.0257	3.7237	.31		1.14
235	1.346E+14	-.0233	3.7254	.31		1.14
236	1.370E+14	-.0209	3.7271	.30		1.13
237	1.393E+14	-.0185	3.7288	.30		1.13
238	1.417E+14	-.0161	3.7305	.30		1.12
239	1.441E+14	-.0138	3.7322	.30		1.12
240	1.465E+14	-.0113	3.7339	.30		1.11
241	1.488E+14	-.0089	3.7355	.30		1.10
242	1.512E+14	-.0065	3.7372	.30		1.10
243	1.536E+14	-.0041	3.7389	.29		1.09
244	1.560E+14	-.0017	3.7406	.29		1.09
245	1.584E+14	.0008	3.7423	.29		1.08
246	1.607E+14	.0032	3.7440	.29		1.08
247	1.631E+14	.0057	3.7457	.29		1.07
248	1.655E+14	.0081	3.7474	.29		1.07
249	1.679E+14	.0106	3.7491	.29		1.06

TABLE C-11

PRE-MAIN-SEQUENCE BINARY MODEL FOR β PERSEI

PRIMARY MASS = $3.15 M_{\odot}$

PERIOD = 2.867 DAYS

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE	SP	24000
1	1.560E+11	1.3804	3.6013	.00		6.70
2	3.135E+11	1.3826	3.6020	.00		6.67
3	4.702E+11	1.3848	3.6046	.03		6.64
4	6.270E+11	1.3870	3.6062	.02		6.60
5	7.337E+11	1.3901	3.6079	.07		6.57
6	9.405E+11	1.3913	3.6095	.07		6.54
7	1.0075E+12	1.3925	3.7011	.06		6.51
8	1.254E+12	1.3957	3.7027	.06		6.47
9	1.411E+12	1.3978	3.7044	.05		6.44
10	1.567E+12	1.4000	3.7060	.05		6.41
11	1.724E+12	1.4022	3.7076	.04		6.38
12	1.981E+12	1.4044	3.7093	.04		6.34
13	2.038E+12	1.4066	3.7109	.03		6.31
14	2.104E+12	1.4087	3.7125	.03		6.28
15	2.351E+12	1.4109	3.7142	.02		6.25
16	2.502E+12	1.4131	3.7158	.02		6.22
17	2.665E+12	1.4153	3.7174	.01		6.19
18	2.921E+12	1.4174	3.7191	.01		6.16
19	2.979E+12	1.4196	3.7207	.00		6.13
20	3.135E+12	1.4218	3.7223	.00		6.09
21	3.292E+12	1.4240	3.7240	.00		6.06
22	3.448E+12	1.4262	3.7256	.00		6.03
23	3.605E+12	1.4283	3.7272	.00		6.00
24	3.762E+12	1.4305	3.7289	.00		5.97
25	3.919E+12	1.4327	3.7305	.00		5.94
26	4.075E+12	1.4349	3.7321	.07		5.91
27	4.232E+12	1.4371	3.7339	.07		5.88
28	4.389E+12	1.4392	3.7354	.06		5.86
29	4.546E+12	1.4414	3.7370	.06		5.83
30	4.702E+12	1.4436	3.7387	.06		5.80
31	4.859E+12	1.4458	3.7403	.05		5.77
32	5.016E+12	1.4479	3.7419	.05		5.74
33	5.173E+12	1.4501	3.7436	.04		5.71
34	5.329E+12	1.4523	3.7452	.04		5.68
35	5.486E+12	1.4545	3.7468	.03		5.65
36	5.643E+12	1.4567	3.7485	.03		5.63
37	5.800E+12	1.4589	3.7501	.02		5.60
38	5.956E+12	1.4610	3.7517	.02		5.57
39	6.113E+12	1.4632	3.7534	.02		5.54
40	6.270E+12	1.4654	3.7550	.01		5.51
41	6.427E+12	1.4676	3.7566	.01		5.49
42	6.583E+12	1.4697	3.7583	.01		5.46
43	6.740E+12	1.4719	3.7599	.00		5.43
44	6.897E+12	1.4741	3.7615	.00		5.40
45	7.054E+12	1.4763	3.7632	.00		5.38
46	7.210E+12	1.4784	3.7648	.00		5.35
47	7.367E+12	1.4806	3.7664	.00		5.32
48	7.524E+12	1.4828	3.7681	.00		5.30
49	7.680E+12	1.4850	3.7697	.00		5.27

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	ROCHE FR	R/R SUN
50	7.937E+12	1.4872	3.7713	.77	5.24
51	7.994E+12	1.4892	3.7730	.77	5.22
52	8.151E+12	1.4915	3.7746	.77	5.19
53	8.307E+12	1.4937	3.7762	.76	5.17
54	8.464E+12	1.4959	3.7779	.76	5.14
55	8.621E+12	1.4981	3.7795	.76	5.11
56	8.778E+12	1.5002	3.7911	.75	5.09
57	8.934E+12	1.5024	3.7928	.75	5.06
58	9.091E+12	1.5046	3.7944	.74	5.04
59	9.248E+12	1.5068	3.7960	.74	5.01
60	9.405E+12	1.5090	3.7977	.74	4.99
61	9.561E+12	1.5111	3.7993	.73	4.96
62	9.718E+12	1.5133	3.7999	.73	4.94
63	9.875E+12	1.5155	3.7926	.73	4.91
64	1.003E+13	1.5177	3.7942	.72	4.89
65	1.019E+13	1.5199	3.7958	.72	4.86
66	1.034E+13	1.5220	3.7975	.71	4.84
67	1.050E+13	1.5242	3.7991	.71	4.82
68	1.066E+13	1.5264	3.8007	.71	4.79
69	1.082E+13	1.5286	3.8024	.70	4.77
70	1.097E+13	1.5308	3.8040	.70	4.74
71	1.113E+13	1.5329	3.8056	.70	4.72
72	1.129E+13	1.5351	3.8073	.69	4.70
73	1.144E+13	1.5373	3.8089	.69	4.67
74	1.160E+13	1.5395	3.8105	.69	4.65
75	1.176E+13	1.5417	3.8122	.68	4.63
76	1.191E+13	1.5438	3.8138	.68	4.60
77	1.207E+13	1.5460	3.8154	.68	4.59
78	1.223E+13	1.5482	3.8171	.67	4.56
79	1.238E+13	1.5504	3.8187	.67	4.53
80	1.254E+13	1.5526	3.8203	.67	4.51
81	1.270E+13	1.5547	3.8220	.66	4.49
82	1.285E+13	1.5569	3.8236	.66	4.47
83	1.301E+13	1.5591	3.8252	.66	4.44
84	1.317E+13	1.5613	3.8269	.65	4.42
85	1.332E+13	1.5635	3.8285	.65	4.40
86	1.348E+13	1.5656	3.8301	.65	4.38
87	1.364E+13	1.5678	3.8318	.64	4.36
88	1.379E+13	1.5700	3.8334	.64	4.33
89	1.395E+13	1.5722	3.8350	.64	4.31
90	1.411E+13	1.5744	3.8367	.63	4.29
91	1.426E+13	1.5766	3.8383	.63	4.27
92	1.442E+13	1.5787	3.8399	.63	4.25
93	1.458E+13	1.5809	3.8416	.62	4.23
94	1.473E+13	1.5831	3.8432	.62	4.21
95	1.489E+13	1.5852	3.8448	.62	4.19
96	1.505E+13	1.5875	3.8465	.61	4.16
97	1.520E+13	1.5897	3.8481	.61	4.14
98	1.536E+13	1.5919	3.8497	.61	4.12
99	1.552E+13	1.5940	3.8514	.61	4.10

MODEL	TIME	LOG(L/MSUN)	LOG(TEFF)	ROCHE	ED	DARSUN
100	1.567E+13	1.5962	3.3530	.60		4.02
101	1.583E+13	1.5984	3.2547	.60		4.06
102	1.599E+13	1.6006	3.3563	.60		4.04
103	1.614E+13	1.6028	3.3570	.59		4.02
104	1.630E+13	1.6049	3.3596	.59		4.00
105	1.646E+13	1.6071	3.3612	.59		3.99
106	1.661E+13	1.6092	3.3628	.58		3.96
107	1.677E+13	1.6115	3.3645	.58		3.94
108	1.693E+13	1.6137	3.3661	.58		3.92
109	1.708E+13	1.6159	3.3677	.58		3.90
110	1.724E+13	1.6181	3.3694	.57		3.88
111	1.740E+13	1.6202	3.3710	.57		3.86
112	1.755E+13	1.6224	3.3726	.57		3.84
113	1.771E+13	1.6246	3.3743	.56		3.82
114	1.787E+13	1.6268	3.3759	.56		3.80
115	1.802E+13	1.6290	3.3775	.56		3.79
116	1.818E+13	1.6312	3.3792	.56		3.77
117	1.834E+13	1.6334	3.3808	.55		3.75
118	1.849E+13	1.6356	3.3824	.55		3.73
119	1.865E+13	1.6377	3.3841	.55		3.71
120	1.881E+13	1.6399	3.3857	.55		3.69
121	1.896E+13	1.6421	3.3874	.54		3.67
122	1.912E+13	1.6443	3.3890	.54		3.66
123	1.928E+13	1.6465	3.3906	.54		3.64
124	1.944E+13	1.6487	3.3923	.53		3.62
125	1.959E+13	1.6509	3.3939	.53		3.60
126	1.975E+13	1.6531	3.3955	.53		3.58
127	1.991E+13	1.6553	3.3972	.53		3.56
128	2.006E+13	1.6575	3.3988	.52		3.55
129	2.022E+13	1.6597	3.4004	.52		3.53
130	2.038E+13	1.6619	3.4021	.52		3.51
131	2.053E+13	1.6640	3.4037	.52		3.49
132	2.069E+13	1.6662	3.4054	.51		3.48
133	2.085E+13	1.6684	3.4070	.51		3.46
134	2.100E+13	1.6706	3.4086	.51		3.44
135	2.116E+13	1.6728	3.4103	.51		3.42
136	2.132E+13	1.6750	3.4119	.50		3.41
137	2.147E+13	1.6772	3.4135	.50		3.39
138	2.163E+13	1.6794	3.4152	.50		3.37
139	2.179E+13	1.6816	3.4168	.50		3.36
140	2.194E+13	1.6838	3.4185	.49		3.34
141	2.210E+13	1.6860	3.4201	.49		3.32
142	2.226E+13	1.6882	3.4217	.49		3.31
143	2.241E+13	1.6904	3.4234	.49		3.29
144	2.257E+13	1.6926	3.4250	.48		3.27
145	2.273E+13	1.6948	3.4266	.48		3.26
146	2.288E+13	1.6970	3.4283	.48		3.24
147	2.304E+13	1.6992	3.4299	.48		3.22
148	2.320E+13	1.7014	3.4316	.47		3.21
149	2.335E+13	1.7036	3.4332	.47		3.19

MODEL	TIME	LOG(L/ALUM)	LOG(TTFF)	DOSE	ED	ALBURN
150	2.351E+12	1.7059	3.0240	.47		3.12
151	2.367E+13	1.7090	3.0345	.47		3.14
152	2.382E+13	1.7102	3.0391	.46		3.14
153	2.398E+12	1.7125	3.0398	.46		3.12
154	2.414E+13	1.7147	3.0414	.46		3.11
155	2.420E+13	1.7160	3.0430	.46		3.10
156	2.445E+13	1.7191	3.0447	.46		3.08
157	2.461E+12	1.7213	3.0463	.45		3.07
158	2.476E+13	1.7235	3.0480	.45		3.05
159	2.492E+12	1.7257	3.0496	.45		3.04
160	2.508E+13	1.7270	3.0512	.45		3.02
161	2.523E+13	1.7302	3.0520	.44		3.01
162	2.539E+13	1.7324	3.0545	.44		2.99
163	2.555E+13	1.7346	3.0562	.44		2.98
164	2.570E+12	1.7368	3.0579	.44		2.96
165	2.586E+13	1.7390	3.0595	.44		2.95
166	2.602E+13	1.7413	3.0611	.43		2.93
167	2.617E+13	1.7435	3.0629	.43		2.92
168	2.633E+12	1.7457	3.0644	.43		2.90
169	2.649E+13	1.7479	3.0661	.42		2.89
170	2.664E+13	1.7502	3.0677	.42		2.87
171	2.680E+13	1.7524	3.0693	.42		2.86
172	2.696E+13	1.7546	3.0710	.42		2.84
173	2.711E+13	1.7568	3.0726	.42		2.83
174	2.727E+13	1.7591	3.0743	.42		2.82
175	2.743E+13	1.7613	3.0759	.41		2.80
176	2.758E+13	1.7636	3.0776	.41		2.79
177	2.774E+12	1.7658	3.0792	.41		2.77
178	2.790E+13	1.7681	3.0809	.41		2.76
179	2.805E+13	1.7703	3.0825	.41		2.75
180	2.821E+13	1.7726	3.0842	.40		2.73
181	2.837E+13	1.7748	3.0859	.40		2.72
182	2.852E+13	1.7771	3.0875	.40		2.71
183	2.868E+13	1.7793	3.0891	.40		2.69
184	2.884E+13	1.7816	3.0908	.40		2.68
185	2.899E+13	1.7838	3.0924	.39		2.67
186	2.915E+13	1.7861	3.0941	.39		2.65
187	2.931E+13	1.7884	3.0957	.39		2.64
188	2.946E+13	1.7906	3.0974	.39		2.63
189	2.962E+13	1.7929	3.0991	.39		2.61
190	2.978E+13	1.7952	4.0007	.33		2.60
191	2.993E+13	1.7974	4.0024	.32		2.59
192	3.009E+13	1.7997	4.0040	.32		2.57
193	3.025E+13	1.8020	4.0057	.32		2.56
194	3.040E+12	1.8043	4.0073	.33		2.55
195	3.056E+13	1.8066	4.0090	.37		2.54
196	3.072E+12	1.8089	4.0107	.37		2.52
197	3.087E+13	1.8111	4.0123	.37		2.51
198	3.103E+13	1.8134	4.0140	.37		2.50
199	3.119E+12	1.8157	4.0157	.37		2.48

MODEI	TIME	LOG(L/L SUN)	LOG(TEMP)	DOCS	SP	DOCSUM
200	3.134E+13	1.8180	4.0173	.27		2.47
201	3.150E+13	1.8204	4.0100	.26		2.46
202	3.166E+13	1.8227	4.0207	.26		2.45
203	3.181E+13	1.8250	4.0223	.26		2.44
204	3.197E+13	1.8273	4.0240	.26		2.42
205	3.213E+13	1.8296	4.0257	.26		2.41
206	3.229E+13	1.8310	4.0273	.25		2.40
207	3.244E+13	1.8343	4.0200	.25		2.30
208	3.260E+13	1.8366	4.0207	.25		2.30
209	3.275E+13	1.8300	4.0223	.25		2.36
210	3.291E+13	1.8413	4.0340	.25		2.35
211	3.307E+13	1.8427	4.0257	.25		2.34
212	3.323E+13	1.8460	4.0274	.24		2.33
213	3.338E+13	1.8484	4.0301	.24		2.32
214	3.354E+13	1.8508	4.0407	.24		2.30
215	3.370E+13	1.8521	4.0424	.24		2.29
216	3.385E+13	1.8555	4.0441	.24		2.28
217	3.401E+13	1.8570	4.0450	.24		2.27
218	3.417E+13	1.8603	4.0475	.22		2.26
219	3.432E+13	1.8627	4.0492	.23		2.25
220	3.448E+13	1.8651	4.0509	.23		2.24
221	3.464E+13	1.8675	4.0525	.22		2.23
222	3.470E+13	1.8690	4.0542	.23		2.21
223	3.495E+13	1.8724	4.0550	.23		2.20
224	3.511E+13	1.8748	4.0576	.22		2.19
225	3.526E+13	1.8772	4.0592	.22		2.18
226	3.542E+13	1.8797	4.0610	.22		2.17
227	3.558E+13	1.8821	4.0627	.22		2.16
228	3.573E+13	1.8846	4.0644	.22		2.15
229	3.589E+13	1.8871	4.0661	.22		2.14
230	3.605E+13	1.8906	4.0679	.21		2.13
231	3.620E+13	1.8921	4.0696	.21		2.12
232	3.636E+13	1.8946	4.0713	.21		2.11
233	3.652E+13	1.8971	4.0730	.21		2.10
234	3.667E+13	1.8996	4.0747	.21		2.09
235	3.683E+13	1.9021	4.0764	.21		2.07
236	3.699E+13	1.9047	4.0782	.20		2.06
237	3.714E+13	1.9072	4.0799	.20		2.05
238	3.730E+13	1.9098	4.0816	.20		2.04
239	3.746E+13	1.9124	4.0834	.20		2.03
240	3.761E+13	1.9150	4.0851	.20		2.02
241	3.777E+13	1.9176	4.0868	.20		2.01
242	3.792E+13	1.9202	4.0886	.20		2.00
243	3.808E+13	1.9227	4.0903	.20		1.99
244	3.824E+13	1.9254	4.0921	.20		1.98
245	3.840E+13	1.9281	4.0939	.20		1.97
246	3.855E+13	1.9308	4.0956	.20		1.96
247	3.871E+13	1.9334	4.0973	.20		1.95
248	3.887E+13	1.9361	4.0991	.20		1.94
249	3.903E+13	1.9388	4.1009	.20		1.93

TABLE C-12

PRE-MAIN-SEQUENCE BINARY MODEL FOR β PERSEI

SECONDARY MASS = 0.74 $M_{\odot}$

PERIOD = 2.867 DAYS

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	POURCE	EFF	PERCENT
1	7.723E+06	5.0207	3.0541	.00		3.27
2	1.554E+07	5.0118	3.0557	.00		3.35
3	2.346E+07	5.0028	3.0573	.02		3.34
4	3.136E+07	5.0730	3.0500	.02		3.32
5	3.227E+07	5.0540	3.0606	.07		3.30
6	4.730E+07	5.0360	3.0622	.07		3.20
7	5.534E+07	5.0171	3.0630	.06		3.27
8	6.337E+07	5.7081	3.0655	.06		3.25
9	7.154E+07	5.7702	3.0671	.05		3.24
10	7.271E+07	5.7602	3.0688	.05		3.22
11	8.788E+07	5.7413	3.0704	.04		3.20
12	9.604E+07	5.7224	3.0720	.04		3.19
13	1.043E+08	5.7034	3.0737	.03		3.17
14	1.124E+08	5.6845	3.0753	.03		3.16
15	1.200E+08	5.6655	3.0760	.02		3.14
16	1.204E+08	5.6466	3.0786	.02		3.12
17	1.372E+08	5.6277	3.0802	.01		3.11
18	1.462E+08	5.6087	3.0812	.01		3.09
19	1.548E+08	5.5898	3.0835	.00		3.08
20	1.634E+08	5.5708	3.0851	.00		3.06
21	1.710E+08	5.5519	3.0867	.00		3.05
22	1.806E+08	5.5330	3.0884	.00		3.03
23	1.893E+08	5.5140	3.0900	.00		3.02
24	1.980E+08	5.4951	3.0916	.08		3.00
25	2.068E+08	5.4761	3.0933	.03		2.99
26	2.157E+08	5.4572	3.0949	.07		2.97
27	2.245E+08	5.4383	3.0965	.07		2.96
28	2.334E+08	5.4193	3.0982	.06		2.94
29	2.424E+08	5.4004	3.0998	.06		2.93
30	2.514E+08	5.3814	3.1014	.06		2.91
31	2.604E+08	5.3625	3.1031	.05		2.90
32	2.695E+08	5.3436	3.1047	.05		2.89
33	2.786E+08	5.3246	3.1063	.04		2.87
34	2.878E+08	5.3057	3.1080	.04		2.86
35	2.971E+08	5.2867	3.1096	.03		2.84
36	3.063E+08	5.2678	3.1112	.03		2.83
37	3.156E+08	5.2488	3.1129	.03		2.81
38	3.250E+08	5.2299	3.1145	.02		2.80
39	3.343E+08	5.2110	3.1161	.02		2.79
40	3.438E+08	5.1920	3.1178	.01		2.77
41	3.532E+08	5.1731	3.1194	.01		2.76
42	3.626E+08	5.1541	3.1210	.01		2.74
43	3.720E+08	5.1352	3.1227	.00		2.73
44	3.814E+08	5.1163	3.1243	.00		2.72
45	3.908E+08	5.0973	3.1259	.00		2.70
46	4.017E+08	5.0784	3.1276	.00		2.69
47	4.114E+08	5.0594	3.1292	.00		2.67
48	4.213E+08	5.0405	3.1309	.00		2.66
49	4.312E+08	5.0216	3.1325	.00		2.65

WAVE	TIME	LOG(L/L SUN)	LOG(TEMP)	WAVE	LOG(L/L SUN)
50	4.412E+08	5.0026	3.1341	.77	2.61
51	4.512E+08	4.9937	3.1357	.77	2.62
52	4.612E+08	4.9647	3.1374	.77	2.61
53	4.713E+08	4.9459	3.1390	.76	2.60
54	4.815E+08	4.9268	3.1406	.76	2.59
55	4.916E+08	4.9079	3.1423	.76	2.57
56	5.019E+08	4.8890	3.1439	.75	2.56
57	5.122E+08	4.8700	3.1455	.75	2.54
58	5.226E+08	4.8511	3.1472	.74	2.53
59	5.330E+08	4.8321	3.1488	.74	2.52
60	5.434E+08	4.8132	3.1504	.74	2.51
61	5.539E+08	4.7942	3.1521	.73	2.49
62	5.645E+08	4.7753	3.1537	.73	2.48
63	5.751E+08	4.7564	3.1553	.73	2.47
64	5.858E+08	4.7374	3.1570	.72	2.46
65	5.965E+08	4.7185	3.1586	.72	2.44
66	6.073E+08	4.6995	3.1602	.71	2.43
67	6.181E+08	4.6806	3.1619	.71	2.42
68	6.290E+08	4.6616	3.1635	.71	2.41
69	6.400E+08	4.6427	3.1651	.70	2.40
70	6.511E+08	4.6238	3.1667	.70	2.39
71	6.634E+08	4.6048	3.1684	.70	2.37
72	6.759E+08	4.5859	3.1700	.69	2.36
73	6.891E+08	4.5669	3.1716	.69	2.35
74	7.030E+08	4.5480	3.1733	.69	2.34
75	7.176E+08	4.5290	3.1749	.69	2.32
76	7.320E+08	4.5101	3.1765	.69	2.31
77	7.489E+08	4.4911	3.1782	.68	2.30
78	7.665E+08	4.4722	3.1798	.67	2.29
79	7.832E+08	4.4533	3.1814	.67	2.28
80	8.018E+08	4.4343	3.1831	.67	2.27
81	8.212E+08	4.4154	3.1847	.66	2.26
82	8.416E+08	4.3964	3.1863	.66	2.24
83	8.630E+08	4.3775	3.1880	.66	2.23
84	8.855E+08	4.3585	3.1896	.65	2.22
85	9.091E+08	4.3396	3.1912	.65	2.21
86	9.339E+08	4.3206	3.1929	.65	2.20
87	9.599E+08	4.3017	3.1945	.64	2.19
88	9.873E+08	4.2828	3.1961	.64	2.18
89	1.016E+09	4.2638	3.1978	.64	2.17
90	1.046E+09	4.2449	3.1994	.63	2.16
91	1.078E+09	4.2259	3.2010	.63	2.15
92	1.111E+09	4.2070	3.2027	.63	2.13
93	1.146E+09	4.1880	3.2043	.62	2.12
94	1.182E+09	4.1691	3.2059	.63	2.11
95	1.221E+09	4.1501	3.2076	.62	2.10
96	1.261E+09	4.1312	3.2092	.61	2.09
97	1.303E+09	4.1122	3.2109	.61	2.08
98	1.348E+09	4.0933	3.2125	.61	2.07
99	1.394E+09	4.0743	3.2141	.61	2.06

MODEL	TIME	LOG(I / I SUN)	LOG(TEMP)	DOSE EQ	D/DSDN
100	1.443E+00	3.0554	3.2157	.60	2.05
101	1.405E+00	3.0364	3.2174	.60	2.04
102	1.540E+00	3.0175	3.2100	.60	2.02
103	1.606E+00	3.0035	3.2206	.50	2.02
104	1.665E+00	3.0706	3.2223	.50	2.01
105	1.727E+00	3.0606	3.2230	.50	2.00
106	1.703E+00	3.0417	3.2256	.58	1.00
107	1.862E+00	3.0227	3.2272	.58	1.00
108	1.934E+00	3.0038	3.2288	.53	1.07
109	2.010E+00	3.3848	3.2305	.58	1.06
110	2.000E+00	3.850	3.2221	.57	1.05
111	2.173E+00	3.8460	3.2337	.57	1.04
112	2.261E+00	3.8280	3.2351	.57	1.03
113	2.353E+00	3.8000	3.2370	.56	1.02
114	2.450E+00	3.7201	3.2386	.56	1.01
115	2.552E+00	3.7711	3.2403	.56	1.00
116	2.650E+00	3.7521	3.2412	.56	1.00
117	2.771E+00	3.7332	3.2435	.55	1.00
118	2.888E+00	3.7142	3.2452	.55	1.07
119	3.012E+00	3.6952	3.2469	.55	1.06
120	3.141E+00	3.6762	3.2484	.55	1.06
121	3.277E+00	3.6574	3.2501	.54	1.05
122	3.420E+00	3.6384	3.2517	.54	1.04
123	3.570E+00	3.6104	3.2532	.54	1.03
124	3.728E+00	3.6005	3.2550	.53	1.02
125	3.803E+00	3.5815	3.2566	.53	1.01
126	4.066E+00	3.5626	3.2582	.53	1.00
127	4.240E+00	3.5436	3.2500	.52	1.00
128	4.440E+00	3.5246	3.2615	.52	1.00
129	4.641E+00	3.5057	3.2631	.52	1.00
130	4.852E+00	3.4867	3.2648	.52	1.00
131	5.073E+00	3.4677	3.2664	.52	1.00
132	5.306E+00	3.4488	3.2680	.51	1.00
133	5.550E+00	3.4298	3.2697	.51	1.00
134	5.806E+00	3.4108	3.2712	.51	1.00
135	6.075E+00	3.3910	3.2729	.51	1.00
136	6.357E+00	3.3720	3.2746	.50	1.00
137	6.654E+00	3.3530	3.2762	.50	1.00
138	6.965E+00	3.3350	3.2779	.50	1.00
139	7.292E+00	3.3160	3.2795	.50	1.00
140	7.635E+00	3.2970	3.2811	.49	1.00
141	7.996E+00	3.2780	3.2828	.49	1.00
142	8.374E+00	3.2591	3.2844	.49	1.00
143	8.771E+00	3.2401	3.2860	.49	1.00
144	9.182E+00	3.2211	3.2877	.48	1.00
145	9.626E+00	3.2021	3.2893	.48	1.00
146	1.000E+01	3.1832	3.2909	.48	1.00
147	1.057E+10	3.1642	3.2926	.48	1.00
148	1.107E+10	3.1452	3.2942	.47	1.00
149	1.161E+10	3.1262	3.2959	.47	1.00

WAVE	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE	SP	2425IN
150	1.217E+10	2.1072	3.2075	.47		1.60
151	1.275E+10	2.0822	3.2001	.47		1.59
152	1.337E+10	2.0602	3.2008	.46		1.58
153	1.401E+10	2.0502	3.2024	.46		1.57
154	1.462E+10	2.0313	3.2040	.46		1.56
155	1.541E+10	2.0122	3.2057	.46		1.56
156	1.615E+10	2.0023	3.2072	.46		1.55
157	1.694E+10	2.0742	3.2080	.45		1.54
158	1.776E+10	2.0553	3.3106	.45		1.53
159	1.863E+10	2.0362	3.3122	.45		1.53
160	1.954E+10	2.0173	3.3130	.45		1.52
161	2.049E+10	2.0023	3.3155	.44		1.51
162	2.150E+10	2.0702	3.3171	.44		1.50
163	2.255E+10	2.0502	3.3192	.44		1.50
164	2.365E+10	2.0313	3.3204	.44		1.49
165	2.482E+10	2.0223	3.3221	.44		1.48
166	2.602E+10	2.0023	3.3237	.43		1.47
167	2.731E+10	2.7942	3.3252	.42		1.47
168	2.866E+10	2.7652	3.3270	.42		1.46
169	3.007E+10	2.7462	3.3286	.42		1.45
170	3.155E+10	2.7272	3.3302	.42		1.44
171	3.310E+10	2.7092	3.3310	.42		1.44
172	3.474E+10	2.6901	3.3335	.42		1.43
173	3.645E+10	2.6701	3.3352	.42		1.42
174	3.825E+10	2.6511	3.3368	.42		1.42
175	4.014E+10	2.6320	3.3384	.41		1.41
176	4.213E+10	2.6130	3.3401	.41		1.40
177	4.421E+10	2.5940	3.3417	.41		1.39
178	4.640E+10	2.5740	3.3434	.41		1.39
179	4.870E+10	2.5550	3.3450	.41		1.38
180	5.112E+10	2.5368	3.3467	.40		1.37
181	5.365E+10	2.5178	3.3483	.40		1.37
182	5.631E+10	2.4987	3.3499	.40		1.36
183	5.911E+10	2.4797	3.3516	.40		1.35
184	6.204E+10	2.4606	3.3532	.40		1.35
185	6.513E+10	2.4415	3.3549	.39		1.34
186	6.836E+10	2.4225	3.3565	.39		1.33
187	7.176E+10	2.4034	3.3582	.39		1.33
188	7.532E+10	2.3842	3.3598	.39		1.32
189	7.908E+10	2.3652	3.3615	.39		1.31
190	8.302E+10	2.3461	3.3631	.38		1.31
191	8.715E+10	2.3270	3.3647	.38		1.30
192	9.150E+10	2.3079	3.3664	.38		1.29
193	9.608E+10	2.2889	3.3680	.38		1.29
194	1.008E+11	2.2697	3.3697	.38		1.28
195	1.059E+11	2.2506	3.3713	.37		1.27
196	1.112E+11	2.2315	3.3730	.37		1.27
197	1.167E+11	2.2124	3.3746	.37		1.26
198	1.225E+11	2.1932	3.3762	.37		1.25
199	1.287E+11	2.1741	3.3779	.37		1.25

MODEL	TIME	LOG(L/L SUN)	LOG(TEFF)	ROCHE ED	D/D SUN
200	1.3515E+11	2.1550	3.2726	.27	1.24
201	1.4105E+11	2.1359	3.3912	.36	1.24
202	1.4805E+11	2.1167	3.3920	.36	1.23
203	1.5645E+11	2.0775	3.3945	.36	1.22
204	1.6425E+11	2.0783	3.3962	.36	1.22
205	1.7245E+11	2.0502	3.3973	.36	1.21
206	1.8105E+11	2.0400	3.3995	.35	1.21
207	1.9015E+11	2.0209	3.3911	.35	1.20
208	1.9945E+11	2.0016	3.3928	.35	1.19
209	2.0965E+11	1.9824	3.3945	.35	1.19
210	2.2025E+11	1.9632	3.3961	.35	1.18
211	2.3125E+11	1.9440	3.3979	.35	1.18
212	2.4285E+11	1.9247	3.3994	.34	1.17
213	2.5505E+11	1.9055	3.4011	.34	1.16
214	2.6795E+11	1.8863	3.4027	.34	1.16
215	2.8125E+11	1.8670	3.4044	.34	1.15
216	2.9545E+11	1.8477	3.4061	.34	1.15
217	3.1025E+11	1.8285	3.4077	.34	1.14
218	3.2585E+11	1.8092	3.4094	.33	1.14
219	3.4225E+11	1.7900	3.4110	.33	1.13
220	3.5945E+11	1.7706	3.4127	.33	1.12
221	3.7755E+11	1.7513	3.4144	.33	1.12
222	3.9655E+11	1.7319	3.4160	.33	1.11
223	4.1655E+11	1.7126	3.4177	.33	1.11
224	4.3745E+11	1.6933	3.4194	.32	1.10
225	4.5955E+11	1.6739	3.4210	.32	1.10
226	4.8275E+11	1.6545	3.4227	.32	1.09
227	5.0705E+11	1.6351	3.4244	.32	1.09
228	5.3265E+11	1.6157	3.4261	.32	1.08
229	5.5955E+11	1.5963	3.4277	.32	1.07
230	5.8785E+11	1.5769	3.4294	.31	1.07
231	6.1755E+11	1.5574	3.4311	.31	1.06
232	6.4875E+11	1.5380	3.4328	.31	1.06
233	6.8165E+11	1.5185	3.4344	.31	1.05
234	7.1615E+11	1.4990	3.4361	.31	1.05
235	7.5245E+11	1.4795	3.4378	.31	1.04
236	7.9055E+11	1.4599	3.4395	.30	1.04
237	8.3065E+11	1.4404	3.4412	.30	1.03
238	8.7275E+11	1.4209	3.4429	.30	1.03
239	9.1705E+11	1.4013	3.4446	.30	1.02
240	9.6345E+11	1.3817	3.4462	.30	1.02
241	1.0135E+12	1.3620	3.4479	.29	1.01
242	1.0645E+12	1.3424	3.4496	.30	1.01
243	1.1185E+12	1.3227	3.4513	.29	1.00
244	1.1755E+12	1.3030	3.4530	.29	1.00
245	1.2355E+12	1.2833	3.4547	.29	1.00
246	1.2985E+12	1.2636	3.4564	.29	1.00
247	1.3645E+12	1.2439	3.4581	.29	1.00
248	1.4345E+12	1.2241	3.4599	.29	1.00
249	1.5045E+12	*-1.2161	3.4615	.29	1.00

TABLE C-13

PRE-MAIN-SEQUENCE BINARY MODEL FOR U SAGITTAE

PRIMARY MASS = 4.27 $M_{\odot}$

PERIOD = 3.381 DAYS

MODEL	TIME	LOG(L/L _{SUN})	LOG(TEMP)	DOSE 50	DZDSUN
1	6.104E+10	1.0332	3.8065	.02	7.22
2	1.221E+11	1.0354	3.8081	.02	7.26
3	1.821E+11	1.0376	3.8098	.02	7.22
4	2.442E+11	1.0397	3.8114	.02	7.72
5	3.052E+11	1.0419	3.8130	.07	7.74
6	3.662E+11	1.0441	3.8147	.07	7.70
7	4.273E+11	1.0463	3.8163	.06	7.66
8	4.883E+11	1.0484	3.8179	.06	7.62
9	5.494E+11	2.0006	3.8196	.05	7.59
10	6.104E+11	2.0028	3.8212	.05	7.55
11	6.715E+11	2.0050	3.8228	.04	7.51
12	7.325E+11	2.0072	3.8245	.04	7.47
13	7.936E+11	2.0093	3.8261	.03	7.43
14	8.546E+11	2.0115	3.8277	.03	7.40
15	9.156E+11	2.0137	3.8294	.02	7.36
16	9.767E+11	2.0159	3.8310	.02	7.32
17	1.038E+12	2.0181	3.8326	.01	7.29
18	1.099E+12	2.0202	3.8343	.01	7.25
19	1.160E+12	2.0224	3.8359	.01	7.21
20	1.221E+12	2.0246	3.8375	.01	7.18
21	1.282E+12	2.0268	3.8392	.00	7.14
22	1.343E+12	2.0289	3.8408	.00	7.11
23	1.404E+12	2.0311	3.8424	.00	7.07
24	1.465E+12	2.0333	3.8441	.03	7.04
25	1.526E+12	2.0355	3.8457	.03	7.00
26	1.587E+12	2.0377	3.8473	.07	6.96
27	1.648E+12	2.0399	3.8490	.07	6.93
28	1.709E+12	2.0420	3.8506	.06	6.90
29	1.770E+12	2.0442	3.8522	.06	6.86
30	1.831E+12	2.0464	3.8539	.06	6.92
31	1.892E+12	2.0485	3.8555	.05	6.79
32	1.953E+12	2.0507	3.8571	.05	6.76
33	2.014E+12	2.0529	3.8588	.04	6.72
34	2.075E+12	2.0551	3.8604	.04	6.69
35	2.136E+12	2.0573	3.8620	.03	6.66
36	2.197E+12	2.0594	3.8637	.03	6.62
37	2.258E+12	2.0616	3.8653	.03	6.59
38	2.320E+12	2.0638	3.8669	.02	6.56
39	2.381E+12	2.0660	3.8686	.02	6.53
40	2.442E+12	2.0682	3.8702	.01	6.49
41	2.503E+12	2.0703	3.8718	.01	6.46
42	2.564E+12	2.0725	3.8735	.01	6.43
43	2.625E+12	2.0747	3.8751	.01	6.40
44	2.686E+12	2.0769	3.8767	.00	6.36
45	2.747E+12	2.0790	3.8784	.02	6.33
46	2.808E+12	2.0812	3.8800	.01	6.30
47	2.869E+12	2.0834	3.8816	.02	6.27
48	2.930E+12	2.0856	3.8833	.02	6.24
49	2.991E+12	2.0878	3.8849	.02	6.21

MODEL	TIME	LOG(L/L _{SUN})	LOG(TEMP)	DOSE/ED	D/D _{SUN}
50	3.052E+12	2.0302	3.3245	.77	6.13
51	3.113E+12	2.0221	3.3282	.77	6.14
52	3.174E+12	2.0243	3.3302	.77	6.11
53	3.235E+12	2.0265	3.3314	.76	6.02
54	3.296E+12	2.0287	3.3331	.76	6.05
55	3.357E+12	2.1009	3.3347	.76	6.02
56	3.418E+12	2.1030	3.3363	.75	5.92
57	3.479E+12	2.1052	3.3380	.75	5.96
58	3.540E+12	2.1074	3.3396	.74	5.92
59	3.601E+12	2.1096	3.3412	.74	5.92
60	3.662E+12	2.1117	3.3429	.74	5.97
61	3.723E+12	2.1139	3.3445	.73	5.94
62	3.784E+12	2.1161	3.3461	.73	5.92
63	3.845E+12	2.1183	3.3478	.73	5.79
64	3.906E+12	2.1204	3.3494	.72	5.76
65	3.967E+12	2.1226	3.3510	.72	5.73
66	4.028E+12	2.1248	3.3527	.71	5.70
67	4.089E+12	2.1270	3.3543	.71	5.67
68	4.150E+12	2.1292	3.3559	.71	5.64
69	4.211E+12	2.1313	3.3576	.70	5.61
70	4.272E+12	2.1335	3.3592	.70	5.59
71	4.333E+12	2.1357	3.3608	.70	5.56
72	4.394E+12	2.1379	3.3625	.69	5.53
73	4.455E+12	2.1401	3.3641	.69	5.50
74	4.516E+12	2.1422	3.3657	.69	5.49
75	4.577E+12	2.1444	3.3674	.68	5.45
76	4.638E+12	2.1466	3.3690	.68	5.42
77	4.699E+12	2.1488	3.3706	.68	5.39
78	4.760E+12	2.1510	3.3723	.67	5.37
79	4.821E+12	2.1531	3.3739	.67	5.34
80	4.882E+12	2.1553	3.3755	.67	5.31
81	4.943E+12	2.1575	3.3772	.66	5.29
82	5.004E+12	2.1597	3.3789	.66	5.26
83	5.065E+12	2.1619	3.3804	.66	5.23
84	5.126E+12	2.1640	3.3821	.65	5.21
85	5.187E+12	2.1662	3.3837	.65	5.18
86	5.248E+12	2.1684	3.3853	.65	5.16
87	5.309E+12	2.1706	3.3870	.64	5.13
88	5.370E+12	2.1728	3.3886	.64	5.10
89	5.431E+12	2.1749	3.3902	.64	5.08
90	5.492E+12	2.1771	3.3919	.63	5.05
91	5.553E+12	2.1793	3.3935	.63	5.03
92	5.614E+12	2.1815	3.3951	.63	5.00
93	5.675E+12	2.1837	3.3968	.62	4.97
94	5.736E+12	2.1859	3.3984	.62	4.95
95	5.797E+12	2.1880	3.3999	.62	4.92
96	5.858E+12	2.1902	3.4017	.61	4.90
97	5.919E+12	2.1924	3.4033	.61	4.88
98	5.980E+12	2.1946	3.4049	.61	4.86
99	6.041E+12	2.1967	3.4066	.61	4.83

MODEI	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE SP	D/D51N
100	6.104E+12	2.1980	3.0682	.60	4.71
101	6.165E+12	2.2011	3.0692	.60	4.72
102	6.226E+12	2.2033	3.0715	.60	4.74
103	6.287E+12	2.2055	3.0731	.59	4.73
104	6.348E+12	2.2077	3.0747	.59	4.71
105	6.409E+12	2.2098	3.0764	.59	4.69
106	6.470E+12	2.2120	3.0780	.58	4.66
107	6.531E+12	2.2142	3.0796	.58	4.64
108	6.592E+12	2.2164	3.0813	.58	4.62
109	6.653E+12	2.2186	3.0829	.58	4.60
110	6.714E+12	2.2207	3.0845	.57	4.57
111	6.775E+12	2.2229	3.0862	.57	4.55
112	6.836E+12	2.2251	3.0878	.57	4.53
113	6.897E+12	2.2273	3.0894	.56	4.50
114	6.958E+12	2.2295	3.0911	.56	4.48
115	7.019E+12	2.2317	3.0927	.56	4.46
116	7.080E+12	2.2338	3.0943	.56	4.44
117	7.141E+12	2.2360	3.0960	.55	4.41
118	7.202E+12	2.2382	3.0976	.55	4.39
119	7.263E+12	2.2404	3.0992	.55	4.37
120	7.324E+12	2.2426	4.0009	.55	4.35
121	7.385E+12	2.2448	4.0025	.54	4.33
122	7.446E+12	2.2469	4.0041	.54	4.30
123	7.507E+12	2.2491	4.0058	.54	4.28
124	7.568E+12	2.2513	4.0074	.53	4.26
125	7.629E+12	2.2535	4.0090	.53	4.24
126	7.690E+12	2.2557	4.0107	.53	4.22
127	7.751E+12	2.2579	4.0123	.53	4.20
128	7.812E+12	2.2601	4.0139	.52	4.18
129	7.873E+12	2.2622	4.0156	.52	4.16
130	7.934E+12	2.2644	4.0172	.52	4.14
131	7.995E+12	2.2666	4.0189	.52	4.11
132	8.056E+12	2.2688	4.0205	.51	4.09
133	8.117E+12	2.2710	4.0221	.51	4.07
134	8.178E+12	2.2732	4.0238	.51	4.05
135	8.239E+12	2.2754	4.0254	.51	4.03
136	8.300E+12	2.2775	4.0270	.50	4.01
137	8.361E+12	2.2797	4.0287	.50	3.99
138	8.423E+12	2.2819	4.0303	.50	3.97
139	8.484E+12	2.2841	4.0319	.50	3.95
140	8.545E+12	2.2863	4.0336	.49	3.93
141	8.606E+12	2.2885	4.0352	.49	3.91
142	8.667E+12	2.2907	4.0368	.49	3.89
143	8.728E+12	2.2929	4.0385	.49	3.97
144	8.789E+12	2.2951	4.0401	.48	3.96
145	8.850E+12	2.2972	4.0417	.48	3.94
146	8.911E+12	2.2994	4.0434	.48	3.92
147	8.972E+12	2.3016	4.0450	.48	3.90
148	9.033E+12	2.3038	4.0467	.47	3.88
149	9.094E+12	2.3060	4.0483	.47	3.86

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	PAUSE	ERR	PARSIM
150	0.155E+12	2.3282	4.2400	.47		2.74
151	0.214E+12	2.3104	4.2516	.47		2.72
152	0.277E+12	2.3126	4.2532	.46		2.70
153	0.330E+12	2.3148	4.2548	.46		2.69
154	0.390E+12	2.3170	4.2565	.46		2.67
155	0.440E+12	2.3192	4.2581	.46		2.65
156	0.521E+12	2.3214	4.2599	.46		2.63
157	0.582E+12	2.3236	4.2614	.45		2.61
158	0.643E+12	2.3258	4.2630	.45		2.59
159	0.704E+12	2.3280	4.2647	.45		2.58
160	0.765E+12	2.3301	4.2663	.45		2.56
161	0.826E+12	2.3322	4.2679	.44		2.54
162	0.887E+12	2.3345	4.2696	.44		2.52
163	0.948E+12	2.3367	4.2712	.44		2.50
164	1.001E+13	2.3389	4.2729	.44		2.49
165	1.007E+13	2.3411	4.2745	.44		2.47
166	1.013E+13	2.3433	4.2761	.43		2.45
167	1.019E+13	2.3455	4.2778	.43		2.44
168	1.025E+13	2.3477	4.2794	.43		2.42
169	1.031E+13	2.3500	4.2810	.43		2.40
170	1.038E+13	2.3522	4.2827	.42		2.38
171	1.044E+13	2.3544	4.2843	.42		2.37
172	1.050E+13	2.3566	4.2860	.42		2.35
173	1.056E+13	2.3588	4.2876	.42		2.33
174	1.062E+13	2.3610	4.2892	.42		2.32
175	1.068E+13	2.3632	4.2909	.41		2.30
176	1.074E+13	2.3654	4.2925	.41		2.29
177	1.080E+13	2.3676	4.2942	.41		2.27
178	1.086E+13	2.3698	4.2958	.41		2.25
179	1.092E+13	2.3720	4.2975	.41		2.23
180	1.098E+13	2.3742	4.2991	.40		2.22
181	1.105E+13	2.3764	4.3007	.40		2.20
182	1.111E+13	2.3787	4.3024	.40		2.19
183	1.117E+13	2.3809	4.3040	.40		2.17
184	1.123E+13	2.3831	4.3057	.40		2.15
185	1.129E+13	2.3853	4.3073	.39		2.14
186	1.135E+13	2.3875	4.3089	.39		2.12
187	1.141E+13	2.3898	4.3106	.39		2.11
188	1.147E+13	2.3920	4.3122	.39		2.09
189	1.153E+13	2.3942	4.3139	.39		2.08
190	1.160E+13	2.3964	4.3155	.38		2.06
191	1.166E+13	2.3986	4.3172	.38		2.05
192	1.172E+13	2.4009	4.3188	.38		2.03
193	1.178E+13	2.4031	4.3205	.38		2.02
194	1.184E+13	2.4053	4.3221	.37		2.00
195	1.190E+13	2.4076	4.3238	.37		2.00
196	1.196E+13	2.4098	4.3254	.37		2.07
197	1.202E+13	2.4120	4.3270	.37		2.06
198	1.208E+13	2.4142	4.3287	.37		2.04
199	1.214E+13	2.4165	4.3303	.37		2.02

MODE	TIME	LOG(I/LSIN)	LOG(TREE)	ROCHE ER	RAPSHI
200	1.221E+12	2.4188	4.1320	.37	2.21
201	1.227E+13	2.4210	4.1326	.36	2.20
202	1.233E+13	2.4222	4.1353	.36	2.33
203	1.239E+12	2.4255	4.1360	.36	2.87
204	1.245E+13	2.4277	4.1366	.36	2.95
205	1.251E+13	2.4300	4.1402	.36	2.94
206	1.257E+13	2.4322	4.1410	.35	2.93
207	1.263E+13	2.4345	4.1435	.35	2.21
208	1.269E+13	2.4368	4.1450	.35	2.90
209	1.275E+13	2.4390	4.1460	.35	2.79
210	1.282E+13	2.4413	4.1485	.35	2.77
211	1.288E+13	2.4435	4.1502	.35	2.76
212	1.294E+13	2.4458	4.1519	.34	2.74
213	1.300E+13	2.4481	4.1535	.34	2.73
214	1.306E+13	2.4503	4.1551	.34	2.71
215	1.312E+13	2.4526	4.1569	.34	2.70
216	1.319E+13	2.4549	4.1584	.34	2.60
217	1.324E+13	2.4572	4.1601	.34	2.67
218	1.330E+12	2.4595	4.1618	.33	2.66
219	1.336E+13	2.4618	4.1634	.33	2.65
220	1.343E+13	2.4640	4.1651	.33	2.62
221	1.349E+13	2.4663	4.1667	.33	2.62
222	1.355E+13	2.4686	4.1684	.33	2.61
223	1.361E+13	2.4709	4.1701	.33	2.50
224	1.367E+13	2.4732	4.1717	.32	2.52
225	1.373E+13	2.4756	4.1734	.32	2.57
226	1.379E+13	2.4779	4.1751	.32	2.56
227	1.385E+13	2.4802	4.1767	.32	2.54
228	1.391E+13	2.4825	4.1784	.32	2.53
229	1.397E+13	2.4848	4.1801	.32	2.50
230	1.404E+13	2.4872	4.1818	.31	2.51
231	1.410E+13	2.4895	4.1834	.31	2.40
232	1.416E+13	2.4918	4.1851	.31	2.49
233	1.422E+13	2.4942	4.1863	.31	2.47
234	1.428E+13	2.4965	4.1884	.31	2.46
235	1.434E+13	2.4989	4.1901	.31	2.44
236	1.440E+13	2.5013	4.1919	.30	2.43
237	1.446E+13	2.5036	4.1935	.30	2.42
238	1.452E+13	2.5060	4.1952	.30	2.41
239	1.458E+13	2.5084	4.1969	.30	2.30
240	1.465E+13	2.5108	4.1985	.30	2.32
241	1.471E+13	2.5132	4.2002	.30	2.37
242	1.477E+13	2.5155	4.2019	.30	2.36
243	1.483E+13	2.5180	4.2036	.30	2.35
244	1.489E+13	2.5204	4.2053	.30	2.34
245	1.495E+13	2.5228	4.2070	.30	2.32
246	1.501E+13	2.5252	4.2087	.30	2.31
247	1.507E+13	2.5276	4.2104	.30	2.30
248	1.513E+13	2.5301	4.2121	.30	2.20
249	1.519E+13	2.5325	4.2139	.30	2.22

TABLE C-14

PRE-MAIN-SEQUENCE BINARY MODEL FOR U SAGITTAE

SECONDARY MASS = 1.60 $M_{\odot}$

PERIOD = 3.381 DAYS

MODEL	TIME	LOG(1/4 SIN)	LOG(TREE)	DOSE UP	W/4 SIN
1	1.330E+00	4.2120	3.3524	.00	5.00
2	2.026E+00	4.1231	3.3540	.00	4.03
3	2.740E+00	4.1742	3.3556	.03	4.05
4	3.506E+00	4.1552	3.3572	.08	4.03
5	4.301E+00	4.1362	3.3580	.07	4.00
6	5.136E+00	4.1173	3.3605	.07	4.93
7	6.012E+00	4.0984	3.3622	.06	4.85
8	6.932E+00	4.0795	3.3629	.06	4.82
9	7.890E+00	4.0605	3.3654	.05	4.80
10	8.913E+00	4.0416	3.3671	.05	4.78
11	9.078E+00	4.0226	3.3697	.04	4.76
12	1.110E+00	4.0037	3.3703	.04	4.73
13	1.227E+00	3.9848	3.3720	.03	4.71
14	1.350E+00	3.9658	3.3736	.03	4.69
15	1.470E+00	3.9460	3.3752	.02	4.66
16	1.615E+00	3.9270	3.3760	.02	4.64
17	1.758E+00	3.9080	3.3785	.01	4.62
18	1.907E+00	3.8891	3.3801	.01	4.59
19	2.065E+00	3.8711	3.3813	.00	4.57
20	2.230E+00	3.8522	3.3834	.00	4.55
21	2.403E+00	3.8332	3.3850	.00	4.52
22	2.584E+00	3.8142	3.3867	.00	4.50
23	2.775E+00	3.7954	3.3883	.00	4.47
24	2.976E+00	3.7764	3.3890	.00	4.46
25	3.186E+00	3.7575	3.3916	.00	4.42
26	3.407E+00	3.7385	3.3932	.07	4.41
27	3.630E+00	3.7196	3.3948	.07	4.39
28	3.882E+00	3.7007	3.3964	.06	4.37
29	4.137E+00	3.6817	3.3981	.06	4.35
30	4.406E+00	3.6628	3.3997	.06	4.32
31	4.687E+00	3.6438	3.4013	.05	4.30
32	4.983E+00	3.6249	3.4030	.05	4.28
33	5.293E+00	3.6060	3.4046	.04	4.26
34	5.610E+00	3.5870	3.4062	.04	4.24
35	5.961E+00	3.5681	3.4079	.03	4.22
36	6.320E+00	3.5491	3.4095	.03	4.20
37	6.697E+00	3.5302	3.4111	.02	4.18
38	7.093E+00	3.5112	3.4128	.02	4.15
39	7.508E+00	3.4923	3.4144	.02	4.13
40	7.945E+00	3.4734	3.4160	.01	4.11
41	8.402E+00	3.4544	3.4177	.01	4.09
42	8.883E+00	3.4355	3.4193	.01	4.07
43	9.389E+00	3.4166	3.4209	.00	4.05
44	9.921E+00	3.3976	3.4226	.00	4.03
45	1.047E+01	3.3787	3.4242	.00	4.01
46	1.106E+01	3.3597	3.4258	.00	3.99
47	1.167E+01	3.3409	3.4275	.00	3.97
48	1.231E+01	3.3219	3.4291	.00	3.95
49	1.299E+01	3.3029	3.4307	.00	3.93

MODE1	TIME	LOG(L/LSUN)	LOG(TEMP)	DOSE ED	D/DSUN
50	1.370E+10	3.2340	3.4324	.77	3.21
51	1.444E+10	3.2650	3.4340	.77	3.22
52	1.523E+10	3.2461	3.4356	.77	3.37
53	1.605E+10	3.2271	3.4373	.76	3.25
54	1.691E+10	3.2082	3.4389	.76	3.23
55	1.781E+10	3.1893	3.4405	.76	3.22
56	1.876E+10	3.1703	3.4422	.75	3.20
57	1.976E+10	3.1514	3.4438	.75	3.78
58	2.081E+10	3.1324	3.4454	.74	3.76
59	2.190E+10	3.1135	3.4471	.74	3.74
60	2.306E+10	3.0946	3.4487	.74	3.72
61	2.427E+10	3.0756	3.4503	.73	3.70
62	2.554E+10	3.0567	3.4520	.73	3.68
63	2.687E+10	3.0377	3.4536	.73	3.67
64	2.828E+10	3.0188	3.4552	.72	3.65
65	2.975E+10	2.9999	3.4569	.72	3.63
66	3.129E+10	2.9809	3.4585	.71	3.61
67	3.291E+10	2.9620	3.4601	.71	3.59
68	3.461E+10	2.9430	3.4618	.71	3.57
69	3.640E+10	2.9241	3.4634	.70	3.56
70	3.828E+10	2.9052	3.4650	.70	3.54
71	4.025E+10	2.8862	3.4667	.70	3.52
72	4.231E+10	2.8673	3.4683	.69	3.50
73	4.448E+10	2.8483	3.4699	.69	3.49
74	4.676E+10	2.8294	3.4716	.69	3.47
75	4.915E+10	2.8105	3.4732	.68	3.45
76	5.167E+10	2.7915	3.4748	.68	3.43
77	5.430E+10	2.7726	3.4765	.68	3.42
78	5.707E+10	2.7536	3.4781	.67	3.40
79	5.998E+10	2.7347	3.4797	.67	3.38
80	6.303E+10	2.7158	3.4814	.67	3.37
81	6.623E+10	2.6968	3.4830	.66	3.35
82	6.959E+10	2.6779	3.4846	.66	3.33
83	7.312E+10	2.6589	3.4863	.66	3.32
84	7.682E+10	2.6400	3.4879	.65	3.30
85	8.071E+10	2.6210	3.4895	.65	3.28
86	8.480E+10	2.6021	3.4912	.65	3.27
87	8.909E+10	2.5832	3.4928	.64	3.25
88	9.359E+10	2.5642	3.4944	.64	3.23
89	9.831E+10	2.5453	3.4961	.64	3.22
90	1.033E+11	2.5263	3.4977	.63	3.20
91	1.085E+11	2.5074	3.4993	.63	3.19
92	1.139E+11	2.4885	3.5009	.63	3.17
93	1.197E+11	2.4695	3.5026	.62	3.15
94	1.257E+11	2.4506	3.5042	.62	3.14
95	1.320E+11	2.4316	3.5058	.62	3.12
96	1.387E+11	2.4127	3.5075	.61	3.11
97	1.457E+11	2.3937	3.5091	.61	3.09
98	1.530E+11	2.3748	3.5107	.61	3.07
99	1.607E+11	2.3559	3.5124	.61	3.06

MODEL	TIME	LOG(L/L _{SUN})	LOG(TEMP)	RADIUS	ED	D/D _{SUN}
100	1.487E+11	2.3360	3.5140	.60		3.04
101	1.772E+11	2.3180	3.5156	.60		3.02
102	1.361E+11	2.2000	3.5173	.60		3.01
103	1.054E+11	2.2301	3.5180	.50		3.00
104	2.052E+11	2.2612	3.5205	.50		2.99
105	2.155E+11	2.2422	3.5222	.50		2.97
106	2.263E+11	2.2233	3.5238	.50		2.95
107	2.376E+11	2.2043	3.5254	.50		2.94
108	2.405E+11	2.1854	3.5271	.50		2.92
109	2.620E+11	2.1664	3.5287	.58		2.91
110	2.752E+11	2.1475	3.5303	.57		2.90
111	2.889E+11	2.1286	3.5320	.57		2.89
112	3.034E+11	2.1096	3.5336	.57		2.87
113	3.186E+11	2.0907	3.5352	.56		2.85
114	3.345E+11	2.0717	3.5360	.56		2.84
115	3.512E+11	2.0528	3.5385	.56		2.82
116	3.688E+11	2.0338	3.5401	.56		2.81
117	3.872E+11	2.0149	3.5418	.55		2.80
118	4.066E+11	1.9960	3.5434	.55		2.78
119	4.260E+11	1.9770	3.5450	.55		2.77
120	4.483E+11	1.9581	3.5467	.55		2.75
121	4.707E+11	1.9391	3.5483	.54		2.74
122	4.942E+11	1.9202	3.5499	.54		2.73
123	5.189E+11	1.9012	3.5516	.54		2.71
124	5.448E+11	1.8823	3.5532	.53		2.70
125	5.720E+11	1.8634	3.5548	.53		2.69
126	6.006E+11	1.8444	3.5565	.53		2.67
127	6.305E+11	1.8255	3.5581	.53		2.66
128	6.620E+11	1.8065	3.5597	.52		2.65
129	6.951E+11	1.7876	3.5614	.52		2.63
130	7.298E+11	1.7686	3.5630	.52		2.62
131	7.662E+11	1.7497	3.5646	.52		2.61
132	8.045E+11	1.7307	3.5663	.51		2.59
133	8.446E+11	1.7118	3.5679	.51		2.58
134	8.868E+11	1.6929	3.5695	.51		2.57
135	9.310E+11	1.6739	3.5712	.51		2.55
136	9.775E+11	1.6550	3.5728	.50		2.54
137	1.026E+12	1.6360	3.5744	.50		2.53
138	1.077E+12	1.6171	3.5761	.50		2.52
139	1.131E+12	1.5981	3.5777	.50		2.50
140	1.188E+12	1.5792	3.5793	.49		2.49
141	1.247E+12	1.5602	3.5810	.49		2.48
142	1.309E+12	1.5413	3.5826	.49		2.47
143	1.374E+12	1.5223	3.5842	.49		2.45
144	1.443E+12	1.5034	3.5859	.48		2.44
145	1.515E+12	1.4844	3.5875	.48		2.42
146	1.590E+12	1.4655	3.5891	.48		2.42
147	1.670E+12	1.4466	3.5908	.48		2.41
148	1.753E+12	1.4276	3.5924	.47		2.39
149	1.840E+12	1.4087	3.5940	.47		2.38

MODEL	TIME	LOG(L/LSUN)	LOG(TEMP)	POUCHES	Q/PSM
150	1.032E+12	1.3897	3.5057	.47	2.37
151	2.020E+12	1.3709	3.5073	.47	2.36
152	2.130E+12	1.3518	3.5089	.46	2.35
153	2.236E+12	1.3329	3.5006	.46	2.33
154	2.347E+12	1.3139	3.5022	.46	2.32
155	2.465E+12	1.2950	3.5038	.46	2.31
156	2.587E+12	1.2760	3.5055	.46	2.30
157	2.716E+12	1.2571	3.5071	.45	2.29
158	2.852E+12	1.2381	3.5087	.45	2.29
159	2.994E+12	1.2192	3.5104	.45	2.27
160	3.143E+12	1.2002	3.5120	.45	2.25
161	3.300E+12	1.1813	3.5136	.44	2.24
162	3.465E+12	1.1623	3.5153	.44	2.23
163	3.637E+12	1.1434	3.5169	.44	2.22
164	3.819E+12	1.1244	3.5185	.44	2.21
165	4.009E+12	1.1054	3.5202	.44	2.20
166	4.209E+12	1.0865	3.5219	.43	2.19
167	4.419E+12	1.0675	3.5234	.43	2.18
168	4.639E+12	1.0486	3.5251	.43	2.17
169	4.871E+12	1.0296	3.5267	.43	2.15
170	5.114E+12	1.0107	3.5283	.42	2.14
171	5.368E+12	.9917	3.5300	.42	2.13
172	5.636E+12	.9728	3.5316	.42	2.12
173	5.917E+12	.9539	3.5332	.42	2.11
174	6.212E+12	.9349	3.5349	.42	2.10
175	6.522E+12	.9159	3.5365	.41	2.09
176	6.847E+12	.8969	3.5381	.41	2.08
177	7.189E+12	.8780	3.5399	.41	2.07
178	7.547E+12	.8590	3.5414	.41	2.06
179	7.923E+12	.8401	3.5431	.41	2.05
180	8.318E+12	.8211	3.5447	.40	2.04
181	8.733E+12	.8021	3.5463	.40	2.03
182	9.169E+12	.7832	3.5480	.40	2.02
183	9.626E+12	.7642	3.5496	.40	2.01
184	1.001E+13	.7458	3.5512	.40	2.00
185	1.040E+13	.7271	3.5529	.39	1.99
186	1.087E+13	.7082	3.5545	.39	1.98
187	1.147E+13	.6894	3.5561	.39	1.97
188	1.203E+13	.6706	3.5578	.39	1.96
189	1.270E+13	.6518	3.5594	.39	1.95
190	1.358E+13	.6329	3.5610	.38	1.94
191	1.456E+13	.6141	3.5627	.38	1.93
192	2.114E+13	.5953	3.5643	.38	1.92
193	2.242E+13	.5765	3.5659	.38	1.91
194	2.370E+13	.5577	3.5676	.38	1.90
195	2.498E+13	.5389	3.5692	.37	1.89
196	2.626E+13	.5201	3.5709	.37	1.88
197	2.754E+13	.5013	3.5725	.37	1.87
198	2.882E+13	.4825	3.5741	.37	1.86
199	3.010E+13	.4636	3.5758	.37	1.85

MODEL	TIME	LOG(L/LI SUN)	LOG(TEMP)	ROCHE FD	BDPSIN
200	3.138E+13	.2030	3.6774	.37	1.24
201	3.266E+13	.2060	3.6700	.36	1.34
202	3.304E+13	.2082	3.6807	.36	1.23
203	3.522E+13	.2104	3.6822	.36	1.32
204	3.650E+13	.2126	3.6832	.36	1.81
205	3.778E+13	.2148	3.6856	.36	1.80
206	3.906E+13	.2170	3.6872	.35	1.72
207	4.034E+13	.2192	3.6888	.35	1.73
208	4.162E+13	.2214	3.6905	.35	1.77
209	4.290E+13	.2236	3.6921	.35	1.76
210	4.418E+13	.2258	3.6938	.35	1.75
211	4.546E+13	.2280	3.6954	.35	1.75
212	4.674E+13	.2302	3.6970	.34	1.74
213	4.802E+13	.2323	3.6987	.34	1.73
214	4.930E+13	.2345	3.7003	.34	1.72
215	5.058E+13	.2367	3.7019	.34	1.71
216	5.186E+13	.2389	3.7036	.34	1.70
217	5.314E+13	.2411	3.7052	.33	1.62
218	5.442E+13	.2433	3.7069	.33	1.62
219	5.570E+13	.2455	3.7085	.33	1.63
220	5.698E+13	.2477	3.7101	.33	1.67
221	5.826E+13	.2499	3.7118	.33	1.66
222	5.954E+13	.2521	3.7134	.33	1.65
223	6.082E+13	.2543	3.7151	.33	1.64
224	6.210E+13	.2566	3.7167	.32	1.64
225	6.338E+13	.2588	3.7183	.32	1.63
226	6.466E+13	.2610	3.7200	.32	1.62
227	6.594E+13	.2632	3.7216	.32	1.61
228	6.722E+13	.2654	3.7233	.32	1.62
229	6.850E+13	.2676	3.7249	.32	1.52
230	6.978E+13	.2699	3.7265	.31	1.52
231	7.106E+13	.2720	3.7282	.31	1.53
232	7.234E+13	.2742	3.7298	.31	1.57
233	7.362E+13	.2764	3.7315	.31	1.56
234	7.490E+13	.2786	3.7331	.31	1.56
235	7.618E+13	.2809	3.7347	.31	1.55
236	7.746E+13	.2831	3.7364	.30	1.54
237	7.874E+13	.2853	3.7380	.30	1.53
238	8.002E+13	.2875	3.7397	.30	1.52
239	8.129E+13	.2897	3.7413	.30	1.52
240	8.257E+13	.2919	3.7430	.30	1.51
241	8.385E+13	.2942	3.7446	.30	1.50
242	8.513E+13	.2964	3.7462	.30	1.42
243	8.641E+13	.2986	3.7479	.30	1.42
244	8.769E+13	.3009	3.7495	.30	1.49
245	8.897E+13	.3031	3.7512	.30	1.47
246	9.025E+13	.3053	3.7528	.30	1.48
247	9.153E+13	.3075	3.7545	.30	1.46
248	9.281E+13	.3098	3.7561	.30	1.45
249	9.409E+13	.3120	3.7578	.30	1.44

TABLE C-15

PRE-MAIN-SEQUENCE BINARY MODEL FOR V505 SAGITTARII

PRIMARY MASS = 2.22 $M_{\odot}$

PERIOD = 1.183 DAYS

MODEL	TIME	LOG(I/USIN)	LOG(T/SEE)	POW15 ED	2/25MIN
1	4.637E+11	.0477	3.7539	.00	3.75
2	0.275E+11	.0400	3.7555	.00	3.74
3	1.301E+12	.0521	3.7571	.08	3.72
4	1.855E+12	.0543	3.7597	.02	3.71
5	2.310E+12	.0565	3.7604	.07	2.70
6	2.782E+12	.0587	3.7620	.07	2.73
7	3.244E+12	.0609	3.7637	.06	2.75
8	3.710E+12	.0632	3.7653	.06	2.75
9	4.174E+12	.0654	3.7670	.05	2.73
10	4.637E+12	.0676	3.7686	.05	2.72
11	5.101E+12	.0698	3.7702	.04	2.71
12	5.565E+12	.0720	3.7710	.04	2.70
13	6.029E+12	.0742	3.7735	.03	2.72
14	6.492E+12	.0764	3.7752	.03	2.73
15	6.956E+12	.0786	3.7768	.02	2.75
16	7.420E+12	.0809	3.7784	.02	2.73
17	7.884E+12	.0831	3.7801	.01	2.72
18	8.347E+12	.0853	3.7817	.01	2.70
19	8.811E+12	.0875	3.7834	.00	2.70
20	9.275E+12	.0898	3.7850	.00	2.72
21	9.739E+12	.0920	3.7867	.00	2.76
22	1.020E+13	.0942	3.7883	.00	2.75
23	1.067E+13	.0964	3.7900	.00	2.74
24	1.113E+13	.0987	3.7916	.08	2.72
25	1.159E+13	1.0000	3.7932	.03	2.71
26	1.206E+13	1.0031	3.7949	.07	2.69
27	1.252E+13	1.0054	3.7965	.07	2.68
28	1.298E+13	1.0076	3.7982	.06	2.67
29	1.345E+13	1.0099	3.7998	.06	2.65
30	1.391E+13	1.0121	3.8015	.06	2.64
31	1.438E+13	1.0143	3.8031	.05	2.63
32	1.484E+13	1.0166	3.8048	.05	2.61
33	1.530E+13	1.0188	3.8064	.04	2.60
34	1.577E+13	1.0210	3.8081	.04	2.59
35	1.623E+13	1.0233	3.8097	.03	2.59
36	1.669E+13	1.0256	3.8114	.03	2.56
37	1.716E+13	1.0279	3.8130	.03	2.55
38	1.762E+13	1.0301	3.8147	.02	2.54
39	1.809E+13	1.0323	3.8163	.02	2.52
40	1.855E+13	1.0346	3.8180	.01	2.51
41	1.901E+13	1.0369	3.8197	.01	2.50
42	1.948E+13	1.0391	3.8213	.01	2.49
43	1.994E+13	1.0414	3.8230	.00	2.47
44	2.040E+13	1.0437	3.8246	.00	2.46
45	2.087E+13	1.0459	3.8263	.00	2.45
46	2.133E+13	1.0482	3.8279	.00	2.44
47	2.180E+13	1.0505	3.8296	.00	2.43
48	2.226E+13	1.0528	3.8313	.08	2.41
49	2.272E+13	1.0551	3.8329	.00	2.40

MODEL	TIME	LOG(L / L SUN)	LOG(TEFF)	PAUSE 32	PAUSE 33
50	2.3195+13	1.0573	3.3346	.77	2.32
51	2.3655+13	1.0596	3.3262	.77	2.32
52	2.4115+13	1.0610	3.3370	.77	2.33
53	2.4585+13	1.0642	3.2206	.76	2.35
54	2.5045+13	1.0665	3.3412	.76	2.34
55	2.5515+13	1.0680	3.3422	.76	2.33
56	2.5975+13	1.0712	3.3446	.75	2.32
57	2.6435+13	1.0735	3.3462	.75	2.31
58	2.6905+13	1.0758	3.3470	.74	2.30
59	2.7365+13	1.0781	3.3496	.74	2.29
60	2.7825+13	1.0805	3.3512	.74	2.27
61	2.9205+13	1.0828	3.3520	.73	2.26
62	2.8755+13	1.0851	3.3546	.73	2.25
63	2.9215+13	1.0875	3.3563	.73	2.24
64	2.9685+13	1.0898	3.3570	.72	2.23
65	3.0145+13	1.0922	3.3596	.72	2.22
66	3.0615+13	1.0945	3.3613	.71	2.21
67	3.1075+13	1.0960	3.3630	.71	2.19
68	3.1535+13	1.0993	3.3646	.71	2.18
69	3.2005+13	1.1017	3.3663	.70	2.17
70	3.2465+13	1.1040	3.3680	.70	2.16
71	3.2925+13	1.1064	3.3697	.70	2.15
72	3.3395+13	1.1088	3.3714	.69	2.14
73	3.3855+13	1.1112	3.3731	.69	2.13
74	3.4325+13	1.1136	3.3748	.69	2.12
75	3.4785+13	1.1160	3.3765	.69	2.11
76	3.5245+13	1.1185	3.3782	.68	2.10
77	3.5715+13	1.1209	3.3799	.68	2.09
78	3.6175+13	1.1233	3.3815	.67	2.08
79	3.6635+13	1.1258	3.3832	.67	2.07
80	3.7105+13	1.1282	3.3849	.67	2.06
81	3.7565+13	1.1307	3.3867	.66	2.05
82	3.8035+13	1.1332	3.3884	.66	2.04
83	3.8495+13	1.1356	3.3901	.66	2.03
84	3.8955+13	1.1381	3.3918	.65	2.01
85	3.9425+13	1.1406	3.3935	.65	2.00
86	3.9885+13	1.1431	3.3952	.65	1.99
87	4.0345+13	1.1456	3.3969	.64	1.98
88	4.0815+13	1.1482	3.3986	.64	1.97
89	4.1275+13	1.1507	3.3994	.64	1.97
90	4.1735+13	1.1533	3.3991	.63	1.96
91	4.2205+13	1.1558	3.3998	.63	1.95
92	4.2665+13	1.1584	3.3995	.63	1.94
93	4.3135+13	1.1610	3.3973	.62	1.93
94	4.3595+13	1.1636	3.3990	.62	1.92
95	4.4055+13	1.1662	3.3998	.62	1.91
96	4.4525+13	1.1688	3.3925	.61	1.90
97	4.4985+13	1.1714	3.3942	.61	1.89
98	4.5445+13	1.1741	3.3960	.61	1.88
99	4.5915+13	1.1767	3.3977	.61	1.87

MODEL	TIME	LOG(L/LSUN)	LOG(TEMP)	POWERS	POWERS
100	4.437E+12	1.1704	3.0105	.60	1.86
101	4.484E+12	1.1821	3.0213	.60	1.85
102	4.730E+12	1.1848	3.0230	.60	1.84
103	4.774E+12	1.1875	3.0243	.50	1.83
104	4.823E+12	1.1902	3.0266	.50	1.82
105	4.869E+12	1.1930	3.0283	.50	1.81
106	4.915E+12	1.1957	3.0301	.53	1.80
107	4.962E+12	1.1985	3.0310	.52	1.80
108	5.008E+12	1.2013	3.0337	.53	1.79
109	5.055E+12	1.2041	3.0355	.52	1.79
110	5.101E+12	1.2070	3.0373	.57	1.77
111	5.147E+12	1.2098	3.0391	.57	1.76
112	5.194E+12	1.2127	3.0400	.57	1.75
113	5.240E+12	1.2156	3.0427	.56	1.74
114	5.286E+12	1.2185	3.0445	.56	1.73
115	5.333E+12	1.2214	3.0463	.56	1.72
116	5.379E+12	1.2244	3.0482	.56	1.72
117	5.425E+12	1.2274	3.0500	.55	1.71
118	5.472E+12	1.2304	3.0518	.55	1.70
119	5.518E+12	1.2334	3.0537	.55	1.69
120	5.565E+12	1.2365	3.0555	.55	1.68
121	5.611E+12	1.2395	3.0574	.54	1.67
122	5.657E+12	1.2426	3.0593	.54	1.67
123	5.704E+12	1.2458	3.0611	.54	1.66
124	5.750E+12	1.2489	3.0630	.53	1.65
125	5.796E+12	1.2521	3.0649	.53	1.64
126	5.843E+12	1.2553	3.0668	.53	1.63
127	5.889E+12	1.2586	3.0687	.53	1.62
128	5.936E+12	1.2618	3.0706	.52	1.62
129	5.982E+12	1.2651	3.0725	.52	1.61
130	6.028E+12	1.2685	3.0744	.52	1.60
131	6.075E+12	1.2718	3.0764	.52	1.59
132	6.121E+12	1.2752	3.0783	.51	1.58
133	6.167E+12	1.2787	3.0802	.51	1.58
134	6.214E+12	1.2821	3.0822	.51	1.57
135	6.260E+12	1.2856	3.0842	.51	1.56
136	6.306E+12	1.2892	3.0861	.50	1.55
137	6.353E+12	1.2927	3.0881	.50	1.54
138	6.399E+12	1.2963	3.0901	.50	1.54
139	6.446E+12	1.3000	3.0921	.50	1.53
140	6.492E+12	1.3037	3.0941	.49	1.52
141	6.538E+12	1.3074	3.0961	.49	1.51
142	6.585E+12	1.3112	3.0982	.49	1.51
143	6.631E+12	1.3150	4.0002	.49	1.50
144	6.677E+12	1.3189	4.0023	.49	1.49
145	6.724E+12	1.3228	4.0043	.48	1.48
146	6.770E+12	1.3267	4.0064	.48	1.48
147	6.817E+12	1.3307	4.0085	.48	1.47
148	6.863E+12	1.3347	4.0106	.47	1.46
149	6.909E+12	1.3389	4.0127	.47	1.45

WAVE	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE	ERR	WAVE
150	6.056E+12	1.2130	4.0148	.47		1.45
151	7.002E+12	1.3472	4.0170	.47		1.44
152	7.040E+12	1.3514	4.0191	.46		1.43
153	7.095E+12	1.3557	4.0213	.46		1.43
154	7.141E+12	1.3601	4.0235	.46		1.42
155	7.187E+12	1.3645	4.0256	.46		1.41
156	7.234E+12	1.3689	4.0278	.46		1.40
157	7.280E+12	1.3734	4.0301	.45		1.40
158	7.327E+12	1.3780	4.0322	.45		1.39
159	7.373E+12	1.3827	4.0345	.45		1.38
160	7.419E+12	1.3873	4.0368	.45		1.38
161	7.466E+12	1.3921	4.0391	.44		1.37
162	7.512E+12	1.3969	4.0414	.44		1.36
163	7.558E+12	1.4018	4.0437	.44		1.36
164	7.605E+12	1.4068	4.0460	.44		1.35
165	7.651E+12	1.4118	4.0484	.44		1.34
166	7.697E+12	1.4169	4.0507	.43		1.34
167	7.744E+12	1.4220	4.0531	.43		1.33
168	7.790E+12	1.4272	4.0555	.43		1.32
169	7.837E+12	1.4325	4.0579	.43		1.32
170	7.883E+12	1.4379	4.0603	.42		1.31
171	7.929E+12	1.4433	4.0628	.42		1.30
172	7.976E+12	1.4488	4.0652	.42		1.30
173	8.022E+12	1.4544	4.0677	.42		1.29
174	8.068E+12	1.4601	4.0702	.42		1.28
175	8.115E+12	1.4658	4.0728	.41		1.28
176	8.161E+12	1.4717	4.0753	.41		1.27
177	8.208E+12	1.4776	4.0779	.41		1.26
178	8.254E+12	1.4835	4.0804	.41		1.26
179	8.300E+12	1.4896	4.0830	.41		1.25
180	8.347E+12	1.4957	4.0857	.40		1.25
181	8.393E+12	1.5020	4.0883	.40		1.24
182	8.439E+12	1.5083	4.0910	.40		1.23
183	8.486E+12	1.5147	4.0937	.40		1.23
184	8.532E+12	1.5212	4.0964	.40		1.22
185	8.578E+12	1.5277	4.0991	.39		1.21
186	8.625E+12	1.5344	4.1019	.39		1.21
187	8.671E+12	1.5411	4.1046	.39		1.20
188	8.718E+12	1.5480	4.1074	.39		1.20
189	8.764E+12	1.5549	4.1103	.39		1.19
190	8.810E+12	1.5619	4.1131	.39		1.18
191	8.857E+12	1.5690	4.1160	.39		1.18
192	8.903E+12	1.5762	4.1189	.39		1.17
193	8.949E+12	1.5835	4.1218	.39		1.17
194	8.996E+12	1.5909	4.1247	.38		1.16
195	9.042E+12	1.5984	4.1277	.37		1.16
196	9.088E+12	1.6060	4.1307	.37		1.15
197	9.135E+12	1.6137	4.1337	.37		1.14
198	9.181E+12	1.6214	4.1367	.37		1.14
199	9.228E+12	1.6293	4.1397	.37		1.13

MODEL	TIME	LOG(L/L1SUN)	LOG(TEMP)	DOCFE ED	24DSUN
200	0.274E+13	1.6373	4.1428	.37	1.12
201	0.220E+13	1.6453	4.1450	.36	1.12
202	0.367E+13	1.6535	4.1491	.36	1.12
203	.000E+00	1.6618	4.1522	.35	.33
204	.000E+00	.0000	.0000	.33	.33
205	.000E+00	.0000	.0000	.33	.33
206	.000E+00	.0000	.0000	.33	.33
207	.000E+00	.0000	.0000	.33	.33
208	.000E+00	.0000	.0000	.33	.33
209	.000E+00	.0000	.0000	.33	.33
210	.000E+00	.0000	.0000	.33	.33
211	.000E+00	.0000	.0000	.33	.33
212	.000E+00	.0000	.0000	.33	.33
213	.000E+00	.0000	.0000	.33	.33
214	.000E+00	.0000	.0000	.33	.33
215	.000E+00	.0000	.0000	.33	.33
216	.000E+00	.0000	.0000	.33	.33
217	.000E+00	.0000	.0000	.33	.33
218	.000E+00	.0000	.0000	.33	.33
219	.000E+00	.0000	.0000	.33	.33
220	.000E+00	.0000	.0000	.33	.33
221	.000E+00	.0000	.0000	.33	.33
222	.000E+00	.0000	.0000	.33	.33
223	.000E+00	.0000	.0000	.33	.33
224	.000E+00	.0000	.0000	.33	.33
225	.000E+00	.0000	.0000	.33	.33
226	.000E+00	.0000	.0000	.33	.33
227	.000E+00	.0000	.0000	.33	.33
228	.000E+00	.0000	.0000	.33	.33
229	.000E+00	.0000	.0000	.33	.33
230	.000E+00	.0000	.0000	.33	.33
231	.000E+00	.0000	.0000	.33	.33
232	.000E+00	.0000	.0000	.33	.33
233	.000E+00	.0000	.0000	.33	.33
234	.000E+00	.0000	.0000	.33	.33
235	.000E+00	.0000	.0000	.33	.33
236	.000E+00	.0000	.0000	.33	.33
237	.000E+00	.0000	.0000	.33	.33
238	.000E+00	.0000	.0000	.33	.33
239	.000E+00	.0000	.0000	.33	.33
240	.000E+00	.0000	.0000	.33	.33
241	.000E+00	.0000	.0000	.33	.33
242	.000E+00	.0000	.0000	.33	.33
243	.000E+00	.0000	.0000	.33	.33
244	.000E+00	.0000	.0000	.33	.33
245	.000E+00	.0000	.0000	.33	.33
246	.000E+00	.0000	.0000	.33	.33
247	.000E+00	.0000	.0000	.33	.33
248	.000E+00	.0000	.0000	.33	.33
249	.000E+00	.0000	.0000	.33	.33

TABLE C-16

PRE-MAIN-SEQUENCE BINARY MODEL FOR V505 SAGITTARII

SECONDARY MASS = 1.18 $M_{\odot}$

PERIOD = 1.183 DAYS

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE 50	DOSE 100
1	7.369E+02	2.5175	3.4302	.02	2.22
2	1.102E+10	2.4086	3.4402	.02	2.27
3	1.618E+10	2.4706	3.4424	.03	2.26
4	2.064E+10	2.4607	3.4441	.02	2.25
5	2.533E+10	2.4417	3.4457	.07	2.24
6	3.024E+10	2.4228	3.4473	.07	2.23
7	3.542E+10	2.4039	3.4490	.06	2.22
8	4.085E+10	2.3849	3.4506	.06	2.20
9	4.655E+10	2.3659	3.4522	.05	2.19
10	5.253E+10	2.3470	3.4539	.05	2.18
11	5.881E+10	2.3280	3.4555	.04	2.17
12	6.540E+10	2.3091	3.4571	.04	2.16
13	7.232E+10	2.2901	3.4587	.03	2.15
14	7.958E+10	2.2712	3.4604	.03	2.14
15	8.721E+10	2.2522	3.4620	.02	2.13
16	9.522E+10	2.2333	3.4637	.02	2.12
17	1.036E+11	2.2143	3.4653	.01	2.11
18	1.125E+11	2.1954	3.4669	.01	2.10
19	1.217E+11	2.1764	3.4686	.00	2.09
20	1.314E+11	2.1575	3.4702	.00	2.08
21	1.417E+11	2.1385	3.4718	.00	2.07
22	1.524E+11	2.1196	3.4735	.00	2.06
23	1.636E+11	2.1006	3.4751	.00	2.04
24	1.755E+11	2.0817	3.4767	.03	2.03
25	1.879E+11	2.0627	3.4784	.03	2.02
26	2.009E+11	2.0437	3.4800	.07	2.01
27	2.146E+11	2.0248	3.4816	.07	2.00
28	2.289E+11	2.0058	3.4833	.06	1.99
29	2.440E+11	1.9869	3.4849	.06	1.98
30	2.598E+11	1.9679	3.4865	.06	1.97
31	2.764E+11	1.9489	3.4882	.05	1.96
32	2.939E+11	1.9300	3.4898	.05	1.95
33	3.122E+11	1.9110	3.4914	.04	1.94
34	3.314E+11	1.8921	3.4931	.04	1.94
35	3.516E+11	1.8731	3.4947	.03	1.93
36	3.728E+11	1.8541	3.4964	.03	1.92
37	3.951E+11	1.8352	3.4980	.03	1.91
38	4.184E+11	1.8162	3.4996	.02	1.90
39	4.429E+11	1.7973	3.5013	.02	1.89
40	4.687E+11	1.7783	3.5029	.01	1.88
41	4.957E+11	1.7593	3.5045	.01	1.87
42	5.241E+11	1.7404	3.5062	.01	1.86
43	5.539E+11	1.7214	3.5078	.00	1.85
44	5.852E+11	1.7024	3.5094	.00	1.84
45	6.180E+11	1.6834	3.5111	.70	1.83
46	6.525E+11	1.6645	3.5127	.70	1.82
47	6.887E+11	1.6455	3.5143	.70	1.81
48	7.267E+11	1.6265	3.5160	.73	1.80
49	7.667E+11	1.6076	3.5176	.73	1.80

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	POUPE 50	2/20 SUN
50	8.086E+11	1.5886	3.5122	.77	1.72
51	8.528E+11	1.5606	3.5200	.77	1.72
52	8.987E+11	1.5506	3.5225	.77	1.77
53	9.472E+11	1.5317	3.5242	.76	1.76
54	9.981E+11	1.5127	3.5252	.76	1.75
55	1.052E+12	1.4937	3.5274	.76	1.74
56	1.108E+12	1.4747	3.5291	.75	1.72
57	1.167E+12	1.4557	3.5307	.75	1.72
58	1.229E+12	1.4367	3.5323	.74	1.72
59	1.293E+12	1.4178	3.5340	.74	1.71
60	1.362E+12	1.3989	3.5356	.74	1.70
61	1.433E+12	1.3798	3.5372	.73	1.69
62	1.508E+12	1.3609	3.5389	.73	1.68
63	1.587E+12	1.3418	3.5405	.73	1.67
64	1.670E+12	1.3228	3.5422	.72	1.67
65	1.757E+12	1.3038	3.5438	.72	1.66
66	1.849E+12	1.2848	3.5454	.71	1.65
67	1.945E+12	1.2658	3.5471	.71	1.64
68	2.045E+12	1.2468	3.5487	.71	1.63
69	2.151E+12	1.2278	3.5502	.70	1.62
70	2.262E+12	1.2088	3.5520	.70	1.62
71	2.379E+12	1.1898	3.5536	.70	1.61
72	2.501E+12	1.1708	3.5553	.69	1.60
73	2.630E+12	1.1518	3.5569	.69	1.59
74	2.765E+12	1.1328	3.5585	.69	1.58
75	2.906E+12	1.1138	3.5602	.68	1.58
76	3.055E+12	1.0948	3.5618	.68	1.57
77	3.211E+12	1.0757	3.5635	.68	1.56
78	3.374E+12	1.0567	3.5651	.67	1.55
79	3.548E+12	1.0377	3.5667	.67	1.54
80	3.729E+12	1.0187	3.5684	.67	1.54
81	3.919E+12	.9996	3.5700	.66	1.53
82	4.118E+12	.9806	3.5717	.66	1.52
83	4.328E+12	.9616	3.5733	.66	1.51
84	4.547E+12	.9425	3.5749	.65	1.51
85	4.778E+12	.9235	3.5766	.65	1.50
86	5.021E+12	.9045	3.5782	.65	1.49
87	5.275E+12	.8854	3.5799	.64	1.48
88	5.543E+12	.8664	3.5815	.64	1.48
89	5.824E+12	.8473	3.5831	.64	1.47
90	6.118E+12	.8282	3.5848	.63	1.46
91	6.428E+12	.8092	3.5864	.63	1.45
92	6.753E+12	.7901	3.5881	.63	1.45
93	7.095E+12	.7711	3.5897	.62	1.44
94	7.453E+12	.7520	3.5914	.62	1.43
95	7.830E+12	.7329	3.5930	.62	1.42
96	8.225E+12	.7138	3.5947	.61	1.42
97	8.640E+12	.6948	3.5963	.61	1.41
98	9.076E+12	.6757	3.5979	.61	1.40
99	9.534E+12	.6566	3.5996	.61	1.40

MODE	TIME	LOG(L/LSUN)	LOG(TEMP)	DOSE	SP	D/PSUN
100	1.0025E+12	.6375	3.6012	.60		1.30
101	1.0525E+12	.6184	3.6022	.60		1.32
102	1.1055E+12	.5922	3.6045	.60		1.22
103	1.1615E+12	.5922	3.6062	.50		1.27
104	1.2105E+12	.5611	3.6079	.50		1.26
105	1.2815E+12	.5410	3.6025	.50		1.35
106	1.3455E+12	.5229	3.6111	.53		1.35
107	1.4135E+12	.5037	3.6129	.50		1.34
108	1.4845E+12	.4845	3.6144	.50		1.34
109	1.5505E+12	.4654	3.6161	.59		1.33
110	1.6385E+12	.4462	3.6177	.57		1.32
111	1.7205E+12	.4271	3.6194	.57		1.32
112	1.8075E+12	.4070	3.6210	.57		1.31
113	1.8985E+12	.3888	3.6227	.56		1.30
114	1.9935E+12	.3696	3.6243	.56		1.29
115	2.0945E+12	.3504	3.6260	.56		1.29
116	2.1995E+12	.3312	3.6276	.56		1.28
117	2.3105E+12	.3120	3.6293	.55		1.28
118	2.4265E+12	.2928	3.6310	.55		1.27
119	2.5495E+12	.2736	3.6326	.55		1.26
120	2.6775E+12	.2544	3.6343	.55		1.26
121	2.8125E+12	.2351	3.6359	.54		1.25
122	2.9545E+12	.2159	3.6376	.54		1.25
123	3.1035E+12	.1966	3.6392	.54		1.24
124	3.2595E+12	.1774	3.6409	.53		1.23
125	3.4245E+12	.1581	3.6426	.53		1.23
126	3.5965E+12	.1389	3.6442	.53		1.22
127	3.7785E+12	.1195	3.6459	.53		1.21
128	3.9695E+12	.1002	3.6476	.52		1.21
129	4.1695E+12	.0809	3.6492	.52		1.20
130	4.4085E+12	-.2784	3.6509	.52		1.20
131	4.8275E+12	-.2761	3.6525	.52		1.19
132	5.1555E+12	-.2739	3.6542	.51		1.18
133	5.4845E+12	-.2715	3.6559	.51		1.17
134	5.8135E+12	-.2692	3.6576	.51		1.17
135	6.1425E+12	-.2668	3.6592	.51		1.17
136	6.4715E+12	-.2645	3.6609	.50		1.16
137	6.8005E+12	-.2622	3.6626	.50		1.15
138	7.1295E+12	-.2598	3.6642	.50		1.15
139	7.4585E+12	-.2575	3.6659	.50		1.14
140	7.7875E+12	-.2551	3.6676	.49		1.14
141	8.1165E+12	-.2528	3.6693	.49		1.13
142	8.4455E+12	-.2504	3.6710	.49		1.13
143	8.7745E+12	-.2480	3.6726	.49		1.12
144	9.1035E+12	-.2456	3.6743	.48		1.12
145	9.4325E+12	-.2433	3.6760	.48		1.11
146	9.7615E+12	-.2409	3.6777	.48		1.10
147	1.0095E+13	-.2385	3.6794	.48		1.10
148	1.0425E+13	-.2361	3.6811	.47		1.09
149	1.0755E+13	-.2337	3.6828	.47		1.09

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOCFR	SD	SD/DOCFR
150	1.109E+14	-.2312	3.4945	.47		1.02
151	1.141E+14	-.2289	3.4961	.47		1.03
152	1.173E+14	-.2264	3.4979	.46		1.07
153	1.206E+14	-.2239	3.4995	.46		1.07
154	1.239E+14	-.2215	3.5012	.46		1.06
155	1.272E+14	-.2190	3.5029	.46		1.06
156	1.305E+14	-.2166	3.5046	.46		1.05
157	1.338E+14	-.2141	3.5064	.45		1.04
158	1.371E+14	-.2116	3.5081	.45		1.04
159	1.404E+14	-.2091	3.5098	.45		1.03
160	1.437E+14	-.2066	3.5015	.45		1.03
161	1.469E+14	-.2041	3.5032	.44		1.02
162	1.502E+14	-.2016	3.5049	.44		1.02
163	1.535E+14	-.1991	3.5066	.44		1.01
164	1.568E+14	-.1966	3.5084	.44		1.01
165	1.601E+14	-.1940	3.5101	.44		1.00
166	1.634E+14	-.1914	3.5118	.43		1.00
167	1.667E+14	-.1889	3.5135	.43		.00
168	1.700E+14	-.1863	3.5152	.43		.00
169	1.733E+14	-.1837	3.5170	.43		.03
170	1.766E+14	-.1811	3.5188	.42		.03
171	1.798E+14	-.1785	3.5205	.42		.07
172	1.831E+14	-.1759	3.5222	.42		.07
173	1.864E+14	-.1732	3.5240	.42		.06
174	1.897E+14	-.1705	3.5258	.42		.06
175	1.930E+14	-.1679	3.5275	.41		.05
176	1.963E+14	-.1652	3.5293	.41		.05
177	1.996E+14	-.1625	3.5310	.41		.05
178	2.029E+14	-.1598	3.5328	.41		.04
179	2.062E+14	-.1570	3.5346	.41		.04
180	2.094E+14	-.1543	3.5363	.40		.03
181	2.127E+14	-.1515	3.5381	.40		.03
182	2.160E+14	-.1487	3.5399	.40		.02
183	2.193E+14	-.1459	3.5417	.40		.02
184	2.226E+14	-.1431	3.5435	.40		.01
185	2.259E+14	-.1403	3.5453	.39		.01
186	2.292E+14	-.1374	3.5471	.39		.00
187	2.325E+14	-.1345	3.5489	.39		.00
188	2.358E+14	-.1316	3.5507	.39		.00
189	2.390E+14	-.1287	3.5525	.39		.00
190	2.423E+14	-.1258	3.5544	.38		.00
191	2.456E+14	-.1229	3.5562	.38		.00
192	2.489E+14	-.1199	3.5580	.38		.00
193	2.522E+14	-.1169	3.5599	.38		.07
194	2.555E+14	-.1139	3.5617	.38		.07
195	2.588E+14	-.1107	3.5636	.37		.06
196	2.621E+14	-.1076	3.5654	.37		.06
197	2.654E+14	-.1045	3.5672	.37		.05
198	2.687E+14	-.1014	3.5690	.37		.05
199	2.719E+14	-.0982	3.5710	.37		.05

MODEL	TIME	LOG(L / SUN)	LOG(TEMP)	DOCTR 52	D/BSUN
200	2.752E+14	1.0050	3.7720	.27	.24
201	2.765E+14	1.0019	3.7748	.26	.24
202	2.819E+14	1.0086	3.7747	.26	.23
203	.000E+00	.0000	.0000	.00	.00
204	.000E+00	.0000	.0000	.00	.00
205	.000E+00	.0000	.0000	.00	.00
206	.000E+00	.0000	.0000	.00	.00
207	.000E+00	.0000	.0000	.00	.00
208	.000E+00	.0000	.0000	.00	.00
209	.000E+00	.0000	.0000	.00	.00
210	.000E+00	.0000	.0000	.00	.00
211	.000E+00	.0000	.0000	.00	.00
212	.000E+00	.0000	.0000	.00	.00
213	.000E+00	.0000	.0000	.00	.00
214	.000E+00	.0000	.0000	.00	.00
215	.000E+00	.0000	.0000	.00	.00
216	.000E+00	.0000	.0000	.00	.00
217	.000E+00	.0000	.0000	.00	.00
218	.000E+00	.0000	.0000	.00	.00
219	.000E+00	.0000	.0000	.00	.00
220	.000E+00	.0000	.0000	.00	.00
221	.000E+00	.0000	.0000	.00	.00
222	.000E+00	.0000	.0000	.00	.00
223	.000E+00	.0000	.0000	.00	.00
224	.000E+00	.0000	.0000	.00	.00
225	.000E+00	.0000	.0000	.00	.00
226	.000E+00	.0000	.0000	.00	.00
227	.000E+00	.0000	.0000	.00	.00
228	.000E+00	.0000	.0000	.00	.00
229	.000E+00	.0000	.0000	.00	.00
230	.000E+00	.0000	.0000	.00	.00
231	.000E+00	.0000	.0000	.00	.00
232	.000E+00	.0000	.0000	.00	.00
233	.000E+00	.0000	.0000	.00	.00
234	.000E+00	.0000	.0000	.00	.00
235	.000E+00	.0000	.0000	.00	.00
236	.000E+00	.0000	.0000	.00	.00
237	.000E+00	.0000	.0000	.00	.00
238	.000E+00	.0000	.0000	.00	.00
239	.000E+00	.0000	.0000	.00	.00
240	.000E+00	.0000	.0000	.00	.00
241	.000E+00	.0000	.0000	.00	.00
242	.000E+00	.0000	.0000	.00	.00
243	.000E+00	.0000	.0000	.00	.00
244	.000E+00	.0000	.0000	.00	.00
245	.000E+00	.0000	.0000	.00	.00
246	.000E+00	.0000	.0000	.00	.00
247	.000E+00	.0000	.0000	.00	.00
248	.000E+00	.0000	.0000	.00	.00
249	.000E+00	.0000	.0000	.00	.00

TABLE C-17

PRE-MAIN-SEQUENCE BINARY MODEL FOR X TRIANGULI

PRIMARY MASS = 1.72 $M_{\odot}$

PERIOD = 0.972 DAYS

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE/ED	D/DOWN
1	3.041E+11	1.2334	3.6259	.02	2.44
2	4.700E+11	1.1344	3.6274	.02	2.42
3	6.442E+11	1.1655	3.6291	.03	2.42
4	8.271E+11	1.1465	3.6307	.03	2.41
5	1.010E+12	1.1276	3.6323	.07	2.32
6	1.221E+12	1.1096	3.6340	.07	2.32
7	1.432E+12	1.0907	3.6356	.06	2.37
8	1.654E+12	1.0707	3.6372	.06	2.35
9	1.888E+12	1.0519	3.6389	.05	2.35
10	2.132E+12	1.0329	3.6405	.05	2.34
11	2.380E+12	1.0130	3.6421	.04	2.32
12	2.650E+12	.9940	3.6439	.04	2.31
13	2.943E+12	.9760	3.6454	.03	2.30
14	3.240E+12	.9570	3.6471	.03	2.29
15	3.552E+12	.9391	3.6487	.02	2.22
16	4.575E+12	.9743	3.6503	.02	2.27
17	5.508E+12	.9765	3.6520	.01	2.25
18	6.421E+12	.9787	3.6536	.01	2.24
19	7.644E+12	.9808	3.6552	.00	2.23
20	8.667E+12	.9830	3.6569	.00	2.22
21	9.600E+12	.9852	3.6585	.00	2.21
22	1.071E+13	.9874	3.6601	.00	2.20
23	1.174E+13	.9896	3.6618	.00	2.19
24	1.276E+13	.9917	3.6634	.08	2.18
25	1.378E+13	.9939	3.6650	.08	2.17
26	1.480E+13	.9961	3.6667	.07	2.16
27	1.583E+13	.9983	3.6683	.07	2.14
28	1.685E+13	.9995	3.6699	.06	2.13
29	1.787E+13	.9927	3.6716	.06	2.12
30	1.890E+13	.9949	3.6732	.06	2.11
31	1.992E+13	.9970	3.6748	.05	2.10
32	2.094E+13	.9992	3.6765	.05	2.09
33	2.196E+13	.9914	3.6781	.04	2.03
34	2.298E+13	.9936	3.6797	.04	2.07
35	2.401E+13	.9958	3.6814	.03	2.06
36	2.503E+13	.9979	3.6830	.03	2.05
37	2.606E+13	.9991	3.6846	.03	2.04
38	2.708E+13	.9923	3.6863	.02	2.03
39	2.810E+13	.9945	3.6879	.02	2.02
40	2.912E+13	.9967	3.6895	.01	2.01
41	3.015E+13	.9989	3.6912	.01	2.00
42	3.117E+13	.9911	3.6928	.01	1.99
43	3.219E+13	.9933	3.6944	.00	1.98
44	3.322E+13	.9954	3.6961	.00	1.97
45	3.424E+13	.9976	3.6977	.72	1.96
46	3.526E+13	.9998	3.6994	.72	1.95
47	3.628E+13	.9920	3.7010	.72	1.94
48	3.731E+13	.9942	3.7026	.72	1.93
49	3.833E+13	.9964	3.7042	.72	1.92

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOCF	DOBS
50	3.035E+13	.3186	3.7050	.77	1.21
51	4.038E+13	.3507	3.7075	.77	1.20
52	4.140E+13	.3520	3.7002	.77	1.20
53	4.242E+13	.3551	3.7102	.76	1.22
54	4.344E+13	.3573	3.7124	.76	1.27
55	4.447E+13	.3595	3.7141	.76	1.26
56	4.549E+13	.3617	3.7157	.75	1.25
57	4.651E+13	.3639	3.7173	.75	1.25
58	4.754E+13	.3661	3.7190	.74	1.24
59	4.856E+13	.3683	3.7206	.74	1.22
60	4.958E+13	.3705	3.7223	.74	1.22
61	5.060E+13	.3727	3.7239	.73	1.21
62	5.163E+13	.3749	3.7255	.73	1.20
63	5.265E+13	.3770	3.7272	.73	1.70
64	5.367E+13	.3792	3.7288	.72	1.73
65	5.470E+13	.3814	3.7304	.72	1.77
66	5.572E+13	.3836	3.7321	.71	1.76
67	5.674E+13	.3858	3.7337	.71	1.75
68	5.776E+13	.3880	3.7354	.71	1.75
69	5.879E+13	.3902	3.7370	.70	1.74
70	5.981E+13	.3924	3.7386	.70	1.73
71	6.083E+13	.3946	3.7403	.70	1.72
72	6.186E+13	.3968	3.7419	.69	1.71
73	6.288E+13	.3990	3.7435	.69	1.70
74	6.390E+13	.4012	3.7452	.69	1.69
75	6.492E+13	.4034	3.7468	.68	1.69
76	6.595E+13	.4056	3.7485	.68	1.62
77	6.697E+13	.4078	3.7501	.69	1.67
78	6.799E+13	.4100	3.7517	.67	1.66
79	6.902E+13	.4122	3.7534	.67	1.65
80	7.004E+13	.4144	3.7550	.67	1.64
81	7.106E+13	.4166	3.7567	.66	1.64
82	7.208E+13	.4188	3.7583	.66	1.63
83	7.311E+13	.4211	3.7599	.66	1.62
84	7.413E+13	.4233	3.7616	.65	1.61
85	7.515E+13	.4255	3.7632	.65	1.60
86	7.618E+13	.4277	3.7649	.65	1.60
87	7.720E+13	.4299	3.7665	.64	1.59
88	7.822E+13	.4321	3.7681	.64	1.58
89	7.924E+13	.4343	3.7699	.64	1.57
90	8.027E+13	.4365	3.7714	.63	1.56
91	8.129E+13	.4387	3.7731	.63	1.56
92	8.231E+13	.4410	3.7747	.62	1.55
93	8.334E+13	.4432	3.7764	.62	1.54
94	8.436E+13	.4454	3.7780	.62	1.53
95	8.538E+13	.4476	3.7796	.62	1.53
96	8.640E+13	.4498	3.7813	.61	1.52
97	8.743E+13	.4521	3.7829	.61	1.51
98	8.845E+13	.4543	3.7846	.61	1.50
99	8.947E+13	.4565	3.7862	.61	1.49

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	ROCHE 50	2/2000
100	0.050E+13	.4587	3.7870	.60	1.42
101	0.152E+13	.4610	3.7895	.60	1.42
102	0.254E+13	.4632	3.7912	.60	1.47
103	0.356E+13	.4654	3.7929	.59	1.47
104	0.458E+13	.4677	3.7944	.59	1.46
105	0.561E+13	.4699	3.7961	.59	1.45
106	0.663E+13	.4721	3.7977	.59	1.44
107	0.766E+13	.4744	3.7994	.59	1.44
108	0.868E+13	.4766	3.8010	.58	1.43
109	0.970E+13	.4789	3.8027	.59	1.42
110	1.007E+14	.4811	3.8043	.57	1.41
111	1.017E+14	.4834	3.8060	.57	1.41
112	1.028E+14	.4856	3.8076	.57	1.40
113	1.038E+14	.4879	3.8093	.56	1.39
114	1.048E+14	.4901	3.8109	.56	1.39
115	1.058E+14	.4924	3.8126	.56	1.38
116	1.068E+14	.4946	3.8142	.56	1.37
117	1.079E+14	.4969	3.8159	.55	1.37
118	1.089E+14	.4992	3.8176	.55	1.36
119	1.099E+14	.5014	3.8192	.55	1.35
120	1.110E+14	.5037	3.8209	.55	1.35
121	1.120E+14	.5060	3.8225	.54	1.34
122	1.130E+14	.5082	3.8242	.54	1.33
123	1.140E+14	.5105	3.8258	.54	1.33
124	1.150E+14	.5128	3.8275	.53	1.32
125	1.161E+14	.5151	3.8292	.53	1.31
126	1.171E+14	.5174	3.8308	.53	1.31
127	1.181E+14	.5197	3.8325	.53	1.30
128	1.191E+14	.5220	3.8341	.52	1.29
129	1.202E+14	.5243	3.8358	.52	1.29
130	1.212E+14	.5266	3.8375	.52	1.28
131	1.222E+14	.5289	3.8391	.52	1.27
132	1.232E+14	.5312	3.8408	.51	1.27
133	1.242E+14	.5335	3.8425	.51	1.26
134	1.253E+14	.5358	3.8441	.51	1.25
135	1.263E+14	.5381	3.8458	.51	1.25
136	1.273E+14	.5404	3.8475	.50	1.24
137	1.283E+14	.5428	3.8491	.50	1.24
138	1.294E+14	.5451	3.8508	.50	1.23
139	1.304E+14	.5474	3.8525	.50	1.22
140	1.314E+14	.5498	3.8542	.49	1.22
141	1.324E+14	.5521	3.8559	.49	1.21
142	1.335E+14	.5545	3.8575	.49	1.20
143	1.345E+14	.5568	3.8592	.49	1.20
144	1.355E+14	.5592	3.8609	.48	1.19
145	1.365E+14	.5616	3.8626	.48	1.19
146	1.375E+14	.5640	3.8642	.48	1.18
147	1.386E+14	.5663	3.8659	.48	1.18
148	1.396E+14	.5687	3.8676	.47	1.17
149	1.406E+14	.5711	3.8693	.47	1.16

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE	SP	DAYSIN
150	1.416E+14	.5725	3.2710	.47		1.16
151	1.427E+14	.5750	3.2727	.47		1.15
152	1.437E+14	.5792	3.2744	.46		1.15
153	1.447E+14	.5808	3.2761	.46		1.14
154	1.457E+14	.5822	3.2778	.46		1.13
155	1.468E+14	.5856	3.2705	.46		1.13
156	1.479E+14	.5891	3.2811	.46		1.12
157	1.489E+14	.5905	3.2829	.45		1.12
158	1.498E+14	.5930	3.2846	.45		1.11
159	1.508E+14	.5955	3.2863	.45		1.11
160	1.510E+14	.5970	3.2880	.45		1.10
161	1.520E+14	.6004	3.2927	.44		1.10
162	1.520E+14	.6020	3.2914	.44		1.09
163	1.540E+14	.6054	3.2931	.44		1.08
164	1.560E+14	.6079	3.2948	.44		1.08
165	1.570E+14	.6105	3.2965	.44		1.07
166	1.580E+14	.6130	3.2983	.43		1.07
167	1.590E+14	.6156	3.2990	.43		1.06
168	1.600E+14	.6181	3.2917	.43		1.06
169	1.611E+14	.6207	3.2935	.43		1.05
170	1.621E+14	.6223	3.2952	.42		1.05
171	1.631E+14	.6250	3.2969	.42		1.04
172	1.641E+14	.6285	3.2987	.42		1.04
173	1.652E+14	.6311	3.2904	.42		1.03
174	1.662E+14	.6337	3.2921	.42		1.03
175	1.672E+14	.6363	3.2939	.41		1.02
176	1.682E+14	.6390	3.2957	.41		1.02
177	1.692E+14	.6417	3.2974	.41		1.01
178	1.703E+14	.6444	3.2992	.41		1.01
179	1.713E+14	.6471	3.2999	.41		1.00
180	1.723E+14	.6498	3.2927	.40		1.00
181	1.733E+14	.6525	3.2945	.40		.99
182	1.744E+14	.6553	3.2962	.40		.99
183	1.754E+14	.6580	3.2980	.40		.98
184	1.764E+14	.6608	3.2998	.40		.98
185	1.774E+14	.6636	3.2916	.39		.97
186	1.785E+14	.6664	3.2934	.39		.97
187	1.795E+14	.6693	3.2952	.39		.96
188	1.805E+14	.6721	3.2970	.39		.96
189	1.815E+14	.6750	3.2988	.39		.95
190	1.825E+14	.6779	3.2906	.38		.95
191	1.836E+14	.6808	3.2924	.38		.94
192	1.846E+14	.6837	3.2942	.38		.94
193	1.856E+14	.6867	3.2961	.38		.93
194	1.866E+14	.6897	3.2979	.38		.93
195	1.877E+14	.6927	3.2997	.37		.92
196	1.887E+14	.6957	3.2916	.37		.92
197	1.897E+14	.6988	3.2934	.37		.91
198	1.907E+14	.7018	3.2953	.37		.91
199	1.918E+14	.7049	3.2972	.37		.91

MODEI	TIME	LOG(L/M/SIN)	LOG(TT/EE)	BOURS 52	2/25 SIN
200	1.028E+14	.7081	3.0500	.37	.20
201	1.038E+14	.7112	3.0600	.36	.20
202	1.048E+14	.7144	3.0622	.36	.20
203	1.050E+14	.7176	3.0647	.36	.20
204	1.060E+14	.7200	3.0666	.36	.20
205	1.070E+14	.7241	3.0685	.36	.20
206	1.080E+14	.7274	3.0704	.35	.27
207	1.090E+14	.7308	3.0723	.35	.27
208	2.010E+14	.7341	3.0743	.35	.27
209	2.020E+14	.7375	3.0762	.35	.26
210	2.030E+14	.7400	3.0781	.35	.26
211	2.040E+14	.7444	3.0801	.35	.25
212	2.050E+14	.7479	3.0821	.34	.25
213	2.061E+14	.7514	3.0840	.34	.24
214	2.071E+14	.7550	3.0860	.34	.24
215	.000E+00	.7586	3.0880	.00	.00
216	.000E+00	.0000	.0000	.00	.00
217	.000E+00	.0000	.0000	.00	.00
218	.000E+00	.0000	.0000	.00	.00
219	.000E+00	.0000	.0000	.00	.00
220	.000E+00	.0000	.0000	.00	.00
221	.000E+00	.0000	.0000	.00	.00
222	.000E+00	.0000	.0000	.00	.00
223	.000E+00	.0000	.0000	.00	.00
224	.000E+00	.0000	.0000	.00	.00
225	.000E+00	.0000	.0000	.00	.00
226	.000E+00	.0000	.0000	.00	.00
227	.000E+00	.0000	.0000	.00	.00
228	.000E+00	.0000	.0000	.00	.00
229	.000E+00	.0000	.0000	.00	.00
230	.000E+00	.0000	.0000	.00	.00
231	.000E+00	.0000	.0000	.00	.00
232	.000E+00	.0000	.0000	.00	.00
233	.000E+00	.0000	.0000	.00	.00
234	.000E+00	.0000	.0000	.00	.00
235	.000E+00	.0000	.0000	.00	.00
236	.000E+00	.0000	.0000	.00	.00
237	.000E+00	.0000	.0000	.00	.00
238	.000E+00	.0000	.0000	.00	.00
239	.000E+00	.0000	.0000	.00	.00
240	.000E+00	.0000	.0000	.00	.00
241	.000E+00	.0000	.0000	.00	.00
242	.000E+00	.0000	.0000	.00	.00
243	.000E+00	.0000	.0000	.00	.00
244	.000E+00	.0000	.0000	.00	.00
245	.000E+00	.0000	.0000	.00	.00
246	.000E+00	.0000	.0000	.00	.00
247	.000E+00	.0000	.0000	.00	.00
248	.000E+00	.0000	.0000	.00	.00
249	.000E+00	.0000	.0000	.00	.00

TABLE C-18

PRE-MAIN-SEQUENCE BINARY MODEL FOR X TRIANGULI

SECONDARY MASS - $1.00 M_{\odot}$

PERIOD = 0.972 DAYS

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE 50	DAYSIN
1	6.730E+00	2.5200	3.4067	.00	1.00
2	1.021E+10	2.5011	3.4084	.00	1.00
3	1.385E+10	2.4821	3.4100	.00	1.00
4	1.768E+10	2.4631	3.4116	.00	1.00
5	2.160E+10	2.4442	3.4133	.07	1.07
6	2.501E+10	2.4252	3.4149	.07	1.06
7	3.034E+10	2.4063	3.4165	.06	1.05
8	3.400E+10	2.3873	3.4182	.06	1.04
9	3.987E+10	2.3683	3.4198	.05	1.03
10	4.402E+10	2.3494	3.4214	.05	1.02
11	5.037E+10	2.3304	3.4231	.04	1.01
12	5.401E+10	2.3114	3.4247	.04	1.00
13	6.104E+10	2.2924	3.4263	.03	1.70
14	6.917E+10	2.2735	3.4280	.03	1.73
15	7.470E+10	2.2545	3.4296	.02	1.70
16	8.156E+10	2.2355	3.4313	.02	1.77
17	8.977E+10	2.2166	3.4329	.01	1.76
18	9.633E+10	2.1976	3.4345	.01	1.75
19	1.043E+11	2.1786	3.4362	.00	1.71
20	1.126E+11	2.1596	3.4378	.00	1.73
21	1.214E+11	2.1407	3.4394	.00	1.70
22	1.305E+11	2.1217	3.4411	.00	1.71
23	1.402E+11	2.1027	3.4427	.00	1.71
24	1.503E+11	2.0837	3.4443	.00	1.70
25	1.610E+11	2.0647	3.4460	.00	1.60
26	1.721E+11	2.0458	3.4476	.07	1.60
27	1.830E+11	2.0268	3.4492	.07	1.67
28	1.962E+11	2.0078	3.4509	.06	1.66
29	2.091E+11	1.9888	3.4525	.06	1.65
30	2.227E+11	1.9698	3.4542	.06	1.65
31	2.369E+11	1.9508	3.4558	.05	1.64
32	2.510E+11	1.9319	3.4574	.05	1.63
33	2.676E+11	1.9128	3.4591	.04	1.62
34	2.841E+11	1.8938	3.4607	.04	1.61
35	3.014E+11	1.8748	3.4623	.03	1.61
36	3.196E+11	1.8558	3.4640	.03	1.60
37	3.387E+11	1.8368	3.4656	.03	1.50
38	3.587E+11	1.8178	3.4673	.02	1.53
39	3.797E+11	1.7988	3.4689	.00	1.57
40	4.018E+11	1.7798	3.4705	.01	1.57
41	4.250E+11	1.7608	3.4722	.01	1.56
42	4.424E+11	1.7418	3.4738	.01	1.55
43	4.750E+11	1.7228	3.4755	.00	1.54
44	5.013E+11	1.7038	3.4771	.00	1.50
45	5.200E+11	1.6848	3.4787	.00	1.53
46	5.506E+11	1.6658	3.4804	.00	1.50
47	5.907E+11	1.6467	3.4820	.00	1.51
48	6.234E+11	1.6277	3.4836	.00	1.50
49	6.577E+11	1.6087	3.4853	.00	1.50

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	PAUSE	ED	2-DEGREE
50	6.237E+11	1.5307	3.4860	.77		1.42
51	7.315E+11	1.5706	3.4824	.77		1.42
52	7.712E+11	1.5516	3.4002	.77		1.47
53	9.129E+11	1.5326	3.4012	.76		1.47
54	9.566E+11	1.5135	3.4035	.76		1.46
55	9.925E+11	1.4945	3.4051	.76		1.45
56	9.509E+11	1.4754	3.4069	.75		1.45
57	1.001E+12	1.4564	3.4084	.75		1.44
58	1.055E+12	1.4373	3.5001	.74		1.43
59	1.111E+12	1.4183	3.5017	.74		1.42
60	1.169E+12	1.3992	3.5033	.74		1.42
61	1.231E+12	1.3801	3.5050	.73		1.41
62	1.296E+12	1.3611	3.5066	.73		1.40
63	1.364E+12	1.3420	3.5083	.73		1.40
64	1.435E+12	1.3230	3.5099	.72		1.39
65	1.510E+12	1.3039	3.5116	.72		1.39
66	1.588E+12	1.2849	3.5132	.71		1.37
67	1.671E+12	1.2657	3.5149	.71		1.37
68	1.759E+12	1.2466	3.5165	.71		1.36
69	1.849E+12	1.2275	3.5182	.70		1.35
70	1.945E+12	1.2084	3.5198	.70		1.35
71	2.045E+12	1.1893	3.5214	.70		1.34
72	2.151E+12	1.1702	3.5231	.69		1.33
73	2.262E+12	1.1511	3.5247	.69		1.33
74	2.379E+12	1.1319	3.5264	.69		1.32
75	2.501E+12	1.1128	3.5280	.68		1.31
76	2.629E+12	1.0937	3.5297	.68		1.31
77	2.764E+12	1.0745	3.5313	.68		1.30
78	2.906E+12	1.0554	3.5330	.67		1.29
79	3.055E+12	1.0362	3.5346	.67		1.29
80	3.211E+12	1.0171	3.5363	.67		1.28
81	3.375E+12	.9979	3.5379	.66		1.28
82	3.548E+12	.9787	3.5396	.66		1.27
83	3.729E+12	.9596	3.5412	.66		1.26
84	3.919E+12	.9404	3.5429	.65		1.26
85	4.110E+12	.9212	3.5446	.65		1.25
86	4.320E+12	.9020	3.5462	.65		1.24
87	4.550E+12	.8828	3.5479	.64		1.24
88	4.781E+12	.8635	3.5495	.64		1.23
89	5.025E+12	.8443	3.5512	.64		1.22
90	5.281E+12	.8251	3.5528	.63		1.22
91	5.549E+12	.8059	3.5545	.63		1.21
92	5.832E+12	.7866	3.5562	.63		1.21
93	6.129E+12	.7672	3.5578	.62		1.20
94	6.440E+12	.7481	3.5595	.62		1.19
95	6.767E+12	.7289	3.5611	.62		1.19
96	7.111E+12	.7095	3.5628	.61		1.18
97	7.472E+12	.6902	3.5645	.61		1.18
98	7.852E+12	.6709	3.5661	.61		1.17
99	8.251E+12	.6516	3.5679	.61		1.17

MODEL	TIME	LOG(L/Z/SUN)	LOG(TEFF)	POACH EP	BZDSUN
100	8.670E+12	.6322	3.5605	.60	1.16
101	9.110E+12	.6129	3.5711	.60	1.15
102	9.572E+12	.5935	3.5723	.60	1.15
103	1.006E+13	.5741	3.5745	.59	1.14
104	1.057E+13	.5547	3.5761	.59	1.14
105	1.111E+13	.5353	3.5772	.59	1.13
106	1.167E+13	.5159	3.5795	.59	1.12
107	1.227E+13	.4965	3.5912	.59	1.12
108	1.289E+13	.4770	3.5929	.58	1.11
109	1.355E+13	.4576	3.5845	.59	1.11
110	1.423E+13	.4381	3.5862	.57	1.10
111	1.496E+13	.4186	3.5879	.57	1.10
112	1.572E+13	.3991	3.5906	.57	1.09
113	1.652E+13	.3796	3.5912	.56	1.09
114	1.736E+13	.3600	3.5929	.56	1.08
115	1.825E+13	.3405	3.5946	.56	1.08
116	1.919E+13	.3209	3.5962	.56	1.07
117	2.015E+13	.3012	3.5980	.55	1.06
118	2.119E+13	.2817	3.5997	.55	1.06
119	2.226E+13	.2620	3.6014	.55	1.05
120	2.340E+13	.2424	3.6031	.55	1.05
121	2.459E+13	.2227	3.6048	.54	1.04
122	2.585E+13	.2030	3.6065	.54	1.04
123	2.717E+13	.1833	3.6082	.54	1.03
124	2.856E+13	.1635	3.6099	.53	1.02
125	3.003E+13	.1437	3.6116	.53	1.02
126	3.156E+13	.1239	3.6133	.53	1.02
127	3.318E+13	.1041	3.6150	.53	1.01
128	3.489E+13	.0843	3.6167	.52	1.01
129	3.668E+13	.0644	3.6184	.52	1.00
130	3.856E+13	.0445	3.6201	.52	1.00
131	4.054E+13	.0245	3.6219	.52	.99
132	4.263E+13	.0046	3.6236	.51	.99
133	4.482E+13	-.0154	3.6253	.51	.98
134	4.713E+13	-.0354	3.6270	.51	.98
135	4.957E+13	-.0555	3.6288	.51	.97
136	5.213E+13	-.0756	3.6305	.50	.97
137	5.482E+13	-.0957	3.6322	.50	.96
138	5.766E+13	-.1159	3.6340	.50	.96
139	6.064E+13	-.1361	3.6357	.50	.95
140	6.379E+13	-.1563	3.6374	.49	.95
141	6.710E+13	-.1766	3.6392	.49	.94
142	7.059E+13	-.1969	3.6409	.49	.94
143	7.426E+13	-.2172	3.6427	.49	.93
144	7.812E+13	-.2376	3.6445	.49	.93
145	8.220E+13	-.2581	3.6462	.48	.93
146	8.649E+13	-.2786	3.6480	.48	.92
147	9.102E+13	-.2991	3.6499	.49	.92
148	9.581E+13	-.3196	3.6515	.47	.91
149	1.020E+14	-.3402	3.6532	.47	.91

MODEL	TIME	LOG(L/MSUN)	LOG(TEMP)	PAQUE 50	PAQUE 50
150	1.075E+14	-5065	3.6551	.47	.90
151	1.130E+14	-5037	3.6560	.47	.90
152	1.185E+14	-5000	3.6597	.46	.90
153	1.240E+14	-4981	3.6605	.46	.90
154	1.295E+14	-4952	3.6623	.46	.90
155	1.350E+14	-4924	3.6641	.46	.90
156	1.405E+14	-4905	3.6650	.46	.90
157	1.460E+14	-4866	3.6677	.45	.90
158	1.515E+14	-4837	3.6695	.45	.90
159	1.570E+14	-4807	3.6713	.45	.90
160	1.624E+14	-4777	3.6730	.45	.90
161	1.679E+14	-4749	3.6750	.44	.90
162	1.734E+14	-4717	3.6762	.44	.90
163	1.789E+14	-4697	3.6797	.44	.90
164	1.844E+14	-4656	3.6805	.44	.90
165	1.899E+14	-4626	3.6824	.44	.90
166	1.954E+14	-4594	3.6843	.43	.90
167	2.009E+14	-4563	3.6861	.43	.90
168	2.064E+14	-4531	3.6880	.43	.90
169	2.119E+14	-4499	3.6900	.43	.90
170	2.174E+14	-4467	3.6913	.42	.90
171	2.229E+14	-4435	3.6937	.42	.90
172	2.284E+14	-4402	3.6956	.42	.90
173	2.339E+14	-4369	3.6975	.42	.90
174	2.394E+14	-4335	3.6995	.42	.90
175	2.449E+14	-4301	3.7014	.41	.90
176	2.504E+14	-4267	3.7033	.41	.90
177	2.559E+14	-4233	3.7052	.41	.90
178	2.614E+14	-4199	3.7072	.41	.90
179	2.669E+14	-4163	3.7092	.41	.90
180	2.723E+14	-4127	3.7112	.40	.90
181	2.778E+14	-4091	3.7132	.40	.90
182	2.833E+14	-4055	3.7152	.40	.90
183	2.888E+14	-4018	3.7172	.40	.90
184	2.943E+14	-3981	3.7192	.40	.90
185	2.998E+14	-3944	3.7212	.39	.90
186	3.053E+14	-3906	3.7233	.39	.90
187	3.108E+14	-3867	3.7253	.39	.90
188	3.163E+14	-3829	3.7274	.39	.90
189	3.218E+14	-3790	3.7294	.39	.90
190	3.273E+14	-3750	3.7315	.38	.90
191	3.328E+14	-3710	3.7336	.38	.90
192	3.383E+14	-3669	3.7357	.38	.90
193	3.438E+14	-3629	3.7378	.38	.90
194	3.493E+14	-3589	3.7400	.38	.90
195	3.548E+14	-3548	3.7421	.37	.90
196	3.603E+14	-3507	3.7443	.37	.90
197	3.658E+14	-3466	3.7464	.37	.90
198	3.713E+14	-3425	3.7486	.37	.90
199	3.768E+14	-3383	3.7508	.37	.90

MODE	TIME	LOG(L/ALPHA)	LOG(T/TF)	DOOUT EP	DOBSIN
200	3.922E+14	-.2328	3.7530	.27	.72
201	3.977E+14	-.2320	3.7552	.26	.70
202	3.932E+14	-.2224	3.7575	.26	.70
203	3.987E+14	-.2187	3.7597	.26	.69
204	4.042E+14	-.2140	3.7620	.26	.69
205	4.097E+14	-.2092	3.7643	.26	.68
206	4.152E+14	-.2043	3.7666	.25	.69
207	4.207E+14	-.2004	3.7689	.25	.69
208	4.262E+14	-.2044	3.7712	.25	.67
209	4.317E+14	-.2304	3.7736	.25	.67
210	4.372E+14	-.2343	3.7760	.25	.67
211	4.427E+14	-.2701	3.7783	.25	.66
212	4.482E+14	-.2739	3.7807	.24	.66
213	4.537E+14	-.2685	3.7832	.24	.66
214	4.592E+14	-.2631	3.7856	.24	.65
215	.000E+00	.0000	.0000	.00	.00
216	.000E+00	.0000	.0000	.00	.00
217	.000E+00	.0000	.0000	.00	.00
218	.000E+00	.0000	.0000	.00	.00
219	.000E+00	.0000	.0000	.00	.00
220	.000E+00	.0000	.0000	.00	.00
221	.000E+00	.0000	.0000	.00	.00
222	.000E+00	.0000	.0000	.00	.00
223	.000E+00	.0000	.0000	.00	.00
224	.000E+00	.0000	.0000	.00	.00
225	.000E+00	.0000	.0000	.00	.00
226	.000E+00	.0000	.0000	.00	.00
227	.000E+00	.0000	.0000	.00	.00
228	.000E+00	.0000	.0000	.00	.00
229	.000E+00	.0000	.0000	.00	.00
230	.000E+00	.0000	.0000	.00	.00
231	.000E+00	.0000	.0000	.00	.00
232	.000E+00	.0000	.0000	.00	.00
233	.000E+00	.0000	.0000	.00	.00
234	.000E+00	.0000	.0000	.00	.00
235	.000E+00	.0000	.0000	.00	.00
236	.000E+00	.0000	.0000	.00	.00
237	.000E+00	.0000	.0000	.00	.00
238	.000E+00	.0000	.0000	.00	.00
239	.000E+00	.0000	.0000	.00	.00
240	.000E+00	.0000	.0000	.00	.00
241	.000E+00	.0000	.0000	.00	.00
242	.000E+00	.0000	.0000	.00	.00
243	.000E+00	.0000	.0000	.00	.00
244	.000E+00	.0000	.0000	.00	.00
245	.000E+00	.0000	.0000	.00	.00
246	.000E+00	.0000	.0000	.00	.00
247	.000E+00	.0000	.0000	.00	.00
248	.000E+00	.0000	.0000	.00	.00
249	.000E+00	.0000	.0000	.00	.00

TABLE C-19

PRE-MAIN-SEQUENCE BINARY MODEL FOR TX URSAE MAJORIS

PRIMARY MASS = 3.13 $M_{\odot}$

PERIOD = 3.062 DAYS

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE ED	D/PSIN
1	1.500E+11	1.3574	3.4911	.00	6.84
2	3.100E+11	1.3526	3.4927	.02	6.31
3	4.700E+11	1.3517	3.4944	.03	6.77
4	6.300E+11	1.3520	3.4960	.03	6.74
5	7.900E+11	1.3561	3.4976	.07	6.71
6	9.500E+11	1.3592	3.4992	.07	6.67
7	1.110E+12	1.3705	3.5000	.06	6.64
8	1.270E+12	1.3726	3.5025	.06	6.61
9	1.430E+12	1.3749	3.5042	.05	6.57
10	1.590E+12	1.3770	3.5059	.05	6.54
11	1.750E+12	1.3792	3.5074	.04	6.51
12	1.910E+12	1.3912	3.5091	.04	6.49
13	2.070E+12	1.3935	3.7007	.03	6.44
14	2.230E+12	1.3957	3.7023	.03	6.41
15	2.390E+12	1.3970	3.7040	.02	6.39
16	2.550E+12	1.3901	3.7056	.02	6.35
17	2.710E+12	1.3922	3.7072	.01	6.32
18	2.870E+12	1.3944	3.7089	.01	6.29
19	3.030E+12	1.3966	3.7105	.00	6.25
20	3.190E+12	1.3989	3.7121	.00	6.22
21	3.350E+12	1.4000	3.7139	.00	6.19
22	3.510E+12	1.4031	3.7154	.80	6.16
23	3.670E+12	1.4053	3.7170	.80	6.13
24	3.830E+12	1.4075	3.7186	.83	6.10
25	3.990E+12	1.4097	3.7202	.88	6.07
26	4.150E+12	1.4119	3.7219	.87	6.04
27	4.310E+12	1.4140	3.7235	.87	6.01
28	4.470E+12	1.4162	3.7252	.86	5.99
29	4.630E+12	1.4184	3.7268	.86	5.95
30	4.790E+12	1.4206	3.7284	.86	5.92
31	4.950E+12	1.4227	3.7301	.85	5.90
32	5.110E+12	1.4249	3.7317	.85	5.86
33	5.270E+12	1.4271	3.7333	.84	5.83
34	5.430E+12	1.4293	3.7350	.84	5.80
35	5.590E+12	1.4314	3.7366	.83	5.77
36	5.750E+12	1.4336	3.7382	.83	5.74
37	5.910E+12	1.4359	3.7399	.83	5.71
38	6.070E+12	1.4380	3.7415	.82	5.69
39	6.230E+12	1.4402	3.7431	.82	5.66
40	6.390E+12	1.4423	3.7449	.81	5.63
41	6.550E+12	1.4445	3.7464	.81	5.60
42	6.710E+12	1.4467	3.7480	.81	5.57
43	6.870E+12	1.4490	3.7497	.80	5.54
44	7.030E+12	1.4511	3.7513	.80	5.52
45	7.190E+12	1.4532	3.7529	.79	5.49
46	7.350E+12	1.4554	3.7546	.79	5.46
47	7.510E+12	1.4576	3.7562	.79	5.43
48	7.670E+12	1.4599	3.7579	.78	5.41
49	7.830E+12	1.4619	3.7595	.79	5.39

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE	EP	2425IN
50	7.0025+12	1.4641	3.7611	.77		5.25
51	8.1525+12	1.4662	3.7627	.77		5.22
52	9.3135+12	1.4685	3.7644	.77		5.20
53	9.4735+12	1.4707	3.7660	.76		5.27
54	9.6335+12	1.4729	3.7676	.76		5.25
55	9.7935+12	1.4750	3.7693	.76		5.22
56	9.9535+12	1.4772	3.7709	.75		5.19
57	9.1125+12	1.4794	3.7725	.75		5.17
58	9.2725+12	1.4816	3.7742	.74		5.14
59	9.4325+12	1.4837	3.7758	.74		5.12
60	9.5925+12	1.4859	3.7774	.74		5.09
61	9.7525+12	1.4881	3.7791	.73		5.07
62	9.9125+12	1.4903	3.7807	.73		5.04
63	1.0075+13	1.4925	3.7823	.73		5.02
64	1.0235+13	1.4946	3.7840	.72		4.99
65	1.0395+13	1.4968	3.7856	.72		4.97
66	1.0555+13	1.4990	3.7872	.71		4.94
67	1.0715+13	1.5012	3.7889	.71		4.92
68	1.0875+13	1.5034	3.7905	.71		4.89
69	1.1035+13	1.5055	3.7921	.70		4.87
70	1.1195+13	1.5077	3.7938	.70		4.84
71	1.1355+13	1.5099	3.7954	.70		4.82
72	1.1515+13	1.5121	3.7970	.69		4.79
73	1.1675+13	1.5143	3.7987	.69		4.77
74	1.1835+13	1.5164	3.8003	.69		4.75
75	1.1995+13	1.5186	3.8019	.68		4.72
76	1.2155+13	1.5208	3.8036	.68		4.70
77	1.2315+13	1.5230	3.8052	.68		4.68
78	1.2475+13	1.5252	3.8068	.67		4.65
79	1.2635+13	1.5273	3.8085	.67		4.63
80	1.2795+13	1.5295	3.8101	.67		4.61
81	1.2955+13	1.5317	3.8117	.66		4.58
82	1.3115+13	1.5339	3.8134	.66		4.56
83	1.3275+13	1.5361	3.8150	.66		4.54
84	1.3435+13	1.5382	3.8166	.65		4.51
85	1.3595+13	1.5404	3.8183	.65		4.49
86	1.3755+13	1.5426	3.8199	.65		4.47
87	1.3915+13	1.5448	3.8215	.64		4.45
88	1.4075+13	1.5470	3.8232	.64		4.42
89	1.4235+13	1.5491	3.8248	.64		4.40
90	1.4395+13	1.5513	3.8264	.63		4.38
91	1.4555+13	1.5535	3.8281	.63		4.36
92	1.4715+13	1.5557	3.8297	.63		4.34
93	1.4875+13	1.5579	3.8314	.62		4.31
94	1.5035+13	1.5601	3.8330	.62		4.29
95	1.5195+13	1.5622	3.8346	.62		4.27
96	1.5355+13	1.5644	3.8363	.61		4.25
97	1.5515+13	1.5666	3.8379	.61		4.22
98	1.5675+13	1.5688	3.8395	.61		4.21
99	1.5835+13	1.5710	3.8412	.61		4.19

MODEL	TIME	LOG(L/L SUN)	LOG(TEFF)	POUNE	ERR	2/DPS IN
100	1.500E+12	1.5732	3.2422	.60		4.17
101	1.618E+12	1.5752	3.2444	.60		4.15
102	1.631E+12	1.5775	3.2461	.60		4.12
103	1.647E+12	1.5797	3.2477	.50		4.10
104	1.662E+12	1.5810	3.2492	.50		4.09
105	1.679E+12	1.5841	3.2510	.50		4.06
106	1.695E+12	1.5863	3.2526	.52		4.04
107	1.711E+12	1.5894	3.2542	.59		4.02
108	1.727E+12	1.5906	3.2550	.58		4.00
109	1.742E+12	1.5929	3.2575	.58		3.98
110	1.758E+12	1.5950	3.2591	.57		3.96
111	1.774E+12	1.5972	3.2608	.57		3.94
112	1.790E+12	1.5994	3.2624	.57		3.92
113	1.806E+12	1.6016	3.2640	.56		3.90
114	1.822E+12	1.6037	3.2657	.56		3.88
115	1.838E+12	1.6050	3.2672	.56		3.86
116	1.854E+12	1.6091	3.2689	.56		3.85
117	1.870E+12	1.6103	3.2706	.55		3.83
118	1.886E+12	1.6125	3.2722	.55		3.81
119	1.902E+12	1.6147	3.2730	.55		3.79
120	1.919E+12	1.6169	3.2755	.55		3.77
121	1.934E+12	1.6190	3.2771	.54		3.75
122	1.950E+12	1.6212	3.2799	.54		3.73
123	1.966E+12	1.6234	3.2804	.54		3.71
124	1.982E+12	1.6256	3.2820	.53		3.69
125	1.998E+12	1.6279	3.2837	.53		3.68
126	2.014E+12	1.6300	3.2852	.53		3.66
127	2.030E+12	1.6322	3.2860	.53		3.64
128	2.046E+12	1.6344	3.2886	.52		3.62
129	2.062E+12	1.6366	3.2902	.52		3.60
130	2.078E+12	1.6388	3.2918	.52		3.58
131	2.094E+12	1.6409	3.2935	.52		3.57
132	2.110E+12	1.6431	3.2951	.51		3.55
133	2.126E+12	1.6452	3.2969	.51		3.53
134	2.142E+12	1.6475	3.2984	.51		3.51
135	2.158E+12	1.6497	3.2999	.51		3.50
136	2.174E+12	1.6519	3.3017	.50		3.48
137	2.190E+12	1.6541	3.3032	.50		3.46
138	2.206E+12	1.6562	3.3049	.50		3.44
139	2.222E+12	1.6585	3.3066	.50		3.43
140	2.238E+12	1.6607	3.3082	.49		3.41
141	2.254E+12	1.6629	3.3099	.49		3.39
142	2.270E+12	1.6651	3.3115	.49		3.38
143	2.286E+12	1.6672	3.3131	.49		3.36
144	2.302E+12	1.6695	3.3148	.48		3.34
145	2.318E+12	1.6717	3.3164	.48		3.32
146	2.334E+12	1.6739	3.3180	.48		3.31
147	2.350E+12	1.6761	3.3197	.48		3.29
148	2.366E+12	1.6783	3.3212	.47		3.28
149	2.382E+12	1.6805	3.3230	.47		3.26

MODEL	TIME	LOG(L/LSUN)	LOG(TEMP)	DOSE F2	ZOR SUN
150	2.309E+13	1.6327	3.0246	.47	3.24
151	2.414E+13	1.6340	3.0262	.47	3.23
152	2.430E+13	1.6371	3.0270	.46	3.21
153	2.446E+13	1.6393	3.0295	.46	3.19
154	2.462E+13	1.6215	3.0312	.46	3.18
155	2.478E+13	1.6227	3.0328	.46	3.16
156	2.494E+13	1.6050	3.0344	.46	3.15
157	2.510E+13	1.6281	3.0361	.45	3.13
159	2.526E+13	1.7003	3.0377	.45	3.12
159	2.542E+13	1.7025	3.0394	.45	3.10
160	2.558E+13	1.7048	3.0410	.45	3.09
161	2.574E+13	1.7070	3.0426	.44	3.07
162	2.590E+13	1.7092	3.0443	.44	3.05
163	2.606E+13	1.7114	3.0459	.44	3.04
164	2.622E+13	1.7136	3.0476	.44	3.02
165	2.638E+13	1.7158	3.0492	.44	3.01
166	2.654E+13	1.7180	3.0509	.43	2.99
167	2.670E+13	1.7203	3.0525	.43	2.98
168	2.686E+13	1.7225	3.0541	.43	2.96
169	2.702E+13	1.7247	3.0558	.42	2.95
170	2.718E+13	1.7269	3.0574	.42	2.93
171	2.733E+13	1.7292	3.0591	.42	2.92
172	2.749E+13	1.7314	3.0607	.42	2.90
173	2.765E+13	1.7336	3.0624	.42	2.89
174	2.781E+13	1.7358	3.0640	.42	2.88
175	2.797E+13	1.7381	3.0657	.41	2.86
176	2.813E+13	1.7403	3.0673	.41	2.85
177	2.829E+13	1.7425	3.0690	.41	2.83
178	2.845E+13	1.7448	3.0706	.41	2.82
179	2.861E+13	1.7470	3.0722	.41	2.80
180	2.877E+13	1.7492	3.0739	.40	2.79
181	2.893E+13	1.7515	3.0755	.40	2.78
182	2.909E+13	1.7537	3.0772	.40	2.76
183	2.925E+13	1.7560	3.0788	.40	2.75
184	2.941E+13	1.7582	3.0805	.40	2.73
185	2.957E+13	1.7605	3.0821	.39	2.72
186	2.973E+13	1.7627	3.0838	.39	2.71
187	2.989E+13	1.7650	3.0854	.39	2.69
188	3.005E+13	1.7672	3.0871	.39	2.68
189	3.021E+13	1.7695	3.0887	.39	2.67
190	3.037E+13	1.7717	3.0904	.38	2.65
191	3.053E+13	1.7740	3.0921	.38	2.64
192	3.069E+13	1.7763	3.0937	.38	2.63
193	3.085E+13	1.7785	3.0954	.38	2.61
194	3.101E+13	1.7808	3.0970	.38	2.60
195	3.117E+13	1.7831	3.0987	.37	2.59
196	3.133E+13	1.7854	4.0003	.37	2.57
197	3.149E+13	1.7876	4.0020	.37	2.56
198	3.165E+13	1.7899	4.0037	.37	2.55
199	3.181E+13	1.7922	4.0053	.37	2.54

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE/ED	2/200M
200	3.107E+13	1.7245	4.0070	.37	2.53
201	3.213E+13	1.7269	4.0086	.36	2.51
202	3.220E+13	1.7091	4.0103	.36	2.50
203	3.245E+13	1.8014	4.0120	.36	2.42
204	3.261E+13	1.8037	4.0136	.36	2.47
205	3.277E+13	1.8060	4.0153	.36	2.46
206	3.293E+13	1.8083	4.0170	.35	2.45
207	3.309E+13	1.8106	4.0186	.35	2.44
208	3.325E+13	1.8129	4.0203	.35	2.42
209	3.341E+13	1.8153	4.0220	.35	2.41
210	3.357E+13	1.8176	4.0236	.35	2.40
211	3.373E+13	1.8199	4.0253	.35	2.39
212	3.389E+13	1.8223	4.0270	.34	2.38
213	3.405E+13	1.8246	4.0286	.34	2.36
214	3.421E+13	1.8269	4.0303	.34	2.35
215	3.437E+13	1.8293	4.0320	.34	2.34
216	3.453E+13	1.8316	4.0337	.34	2.32
217	3.469E+13	1.8340	4.0354	.34	2.32
218	3.485E+13	1.8364	4.0370	.33	2.31
219	3.501E+13	1.8387	4.0387	.33	2.29
220	3.517E+13	1.8411	4.0404	.33	2.28
221	3.533E+13	1.8435	4.0421	.33	2.27
222	3.549E+13	1.8459	4.0438	.33	2.26
223	3.565E+13	1.8483	4.0455	.33	2.25
224	3.581E+13	1.8507	4.0471	.32	2.24
225	3.597E+13	1.8531	4.0488	.32	2.23
226	3.613E+13	1.8555	4.0505	.32	2.22
227	3.629E+13	1.8580	4.0522	.32	2.20
228	3.644E+13	1.8604	4.0539	.32	2.19
229	3.660E+13	1.8628	4.0556	.32	2.18
230	3.676E+13	1.8653	4.0573	.31	2.17
231	3.692E+13	1.8677	4.0590	.31	2.16
232	3.708E+13	1.8702	4.0607	.31	2.15
233	3.724E+13	1.8727	4.0624	.31	2.14
234	3.740E+13	1.8752	4.0641	.31	2.13
235	3.756E+13	1.8776	4.0659	.31	2.12
236	3.772E+13	1.8801	4.0676	.30	2.11
237	3.788E+13	1.8827	4.0693	.30	2.10
238	3.804E+13	1.8852	4.0710	.30	2.09
239	3.820E+13	1.8877	4.0727	.30	2.08
240	3.836E+13	1.8902	4.0744	.30	2.07
241	3.852E+13	1.8928	4.0762	.30	2.05
242	3.868E+13	1.8954	4.0779	.30	2.04
243	3.884E+13	1.8979	4.0796	.30	2.03
244	3.900E+13	1.9005	4.0814	.30	2.02
245	3.916E+13	1.9031	4.0831	.30	2.01
246	3.932E+13	1.9057	4.0849	.30	2.00
247	3.948E+13	1.9083	4.0866	.30	1.99
248	3.964E+13	1.9110	4.0883	.30	1.99
249	3.980E+13	1.9136	4.0901	.30	1.97

TABLE C-20

PRE-MAIN SEQUENCE BINARY MODEL FOR TX URSAE MAJORIS

SECONDARY MASS = 0.90 $M_{\odot}$

PERIOD = 3.063 DAYS

MODE	TIME	LOG(L/LSUN)	LOG(T/555)	ROQUE	SP	240SUN
1	1.018E+07	5.5720	3.1225	.02		2.81
2	2.020E+07	5.5300	3.1242	.02		2.72
3	3.067E+07	5.5410	3.1252	.03		2.77
4	4.101E+07	5.5221	3.1274	.03		2.75
5	5.142E+07	5.5031	3.1200	.07		2.72
6	6.182E+07	5.4942	3.1307	.07		2.71
7	7.236E+07	5.4653	3.1322	.06		2.70
8	8.200E+07	5.4463	3.1330	.06		2.69
9	9.350E+07	5.4274	3.1256	.05		2.66
10	1.042E+08	5.4094	3.1372	.05		2.64
11	1.140E+08	5.3905	3.1389	.04		2.62
12	1.256E+08	5.3706	3.1405	.04		2.60
13	1.364E+08	5.3516	3.1421	.03		2.59
14	1.473E+08	5.3327	3.1437	.03		2.57
15	1.582E+08	5.3137	3.1454	.02		2.55
16	1.692E+08	5.2948	3.1470	.02		2.53
17	1.803E+08	5.2750	3.1486	.01		2.51
18	1.914E+08	5.2560	3.1503	.01		2.50
19	2.025E+08	5.2370	3.1519	.00		2.49
20	2.137E+08	5.2180	3.1535	.00		2.46
21	2.250E+08	5.2001	3.1552	.00		2.45
22	2.363E+08	5.1812	3.1568	.00		2.43
23	2.477E+08	5.1622	3.1584	.00		2.41
24	2.592E+08	5.1433	3.1601	.03		2.39
25	2.706E+08	5.1243	3.1617	.03		2.38
26	2.821E+08	5.1054	3.1633	.07		2.36
27	2.937E+08	5.0865	3.1650	.07		2.34
28	3.054E+08	5.0675	3.1666	.06		2.33
29	3.171E+08	5.0486	3.1682	.06		2.31
30	3.288E+08	5.0296	3.1699	.06		2.29
31	3.408E+08	5.0107	3.1715	.05		2.28
32	3.527E+08	4.9918	3.1731	.05		2.26
33	3.647E+08	4.9728	3.1748	.04		2.24
34	3.767E+08	4.9539	3.1764	.04		2.23
35	3.887E+08	4.9349	3.1780	.03		2.21
36	4.008E+08	4.9160	3.1797	.03		2.20
37	4.130E+08	4.8971	3.1813	.03		2.18
38	4.253E+08	4.8781	3.1829	.02		2.16
39	4.376E+08	4.8592	3.1846	.02		2.15
40	4.500E+08	4.8402	3.1862	.01		2.13
41	4.624E+08	4.8212	3.1879	.01		2.12
42	4.748E+08	4.8024	3.1895	.01		2.10
43	4.875E+08	4.7834	3.1911	.00		2.09
44	5.002E+08	4.7645	3.1927	.00		2.07
45	5.129E+08	4.7455	3.1944	.00		2.05
46	5.256E+08	4.7266	3.1960	.00		2.04
47	5.385E+08	4.7077	3.1976	.00		2.02
48	5.514E+08	4.6887	3.1993	.00		2.01
49	5.644E+08	4.6698	3.2009	.00		2.00

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	ROCHE SR	DAYSIN
50	5.774E+02	4.4502	3.2025	.77	2.02
51	5.907E+02	4.4310	3.2042	.77	2.04
52	6.047E+02	4.4120	3.2058	.77	2.05
53	6.194E+02	4.3940	3.2074	.76	2.03
54	6.348E+02	4.3751	3.2091	.76	2.02
55	6.509E+02	4.3561	3.2107	.76	2.01
56	6.679E+02	4.3372	3.2123	.75	2.00
57	6.857E+02	4.3182	3.2140	.75	2.02
58	7.044E+02	4.2992	3.2156	.74	2.06
59	7.240E+02	4.2804	3.2172	.74	2.05
60	7.446E+02	4.2614	3.2189	.74	2.03
61	7.662E+02	4.2425	3.2205	.73	2.02
62	7.889E+02	4.2235	3.2221	.73	2.01
63	8.127E+02	4.2046	3.2238	.73	2.70
64	8.377E+02	4.1857	3.2254	.72	2.79
65	8.640E+02	4.1667	3.2270	.72	2.76
66	8.916E+02	4.1478	3.2287	.71	2.75
67	9.206E+02	4.1288	3.2303	.71	2.74
68	9.510E+02	4.1099	3.2319	.71	2.72
69	9.829E+02	4.0909	3.2335	.70	2.71
70	1.016E+03	4.0720	3.2352	.70	2.69
71	1.052E+03	4.0531	3.2368	.70	2.68
72	1.088E+03	4.2341	3.2384	.69	2.67
73	1.127E+03	4.2152	3.2401	.69	2.65
74	1.168E+03	4.1962	3.2417	.69	2.64
75	1.211E+03	4.1773	3.2433	.69	2.63
76	1.255E+03	4.1584	3.2450	.68	2.62
77	1.302E+03	4.1394	3.2466	.69	2.60
78	1.352E+03	4.1205	3.2482	.67	2.59
79	1.404E+03	4.1015	3.2499	.67	2.58
80	1.458E+03	4.0826	3.2515	.67	2.56
81	1.515E+03	4.0636	3.2531	.66	2.55
82	1.575E+03	4.0447	3.2548	.66	2.54
83	1.638E+03	4.0258	3.2564	.66	2.52
84	1.705E+03	4.0068	3.2580	.65	2.51
85	1.774E+03	3.9879	3.2597	.65	2.50
86	1.847E+03	3.9689	3.2613	.65	2.49
87	1.924E+03	3.9500	3.2629	.64	2.47
88	2.004E+03	3.9310	3.2646	.64	2.46
89	2.088E+03	3.9121	3.2662	.64	2.45
90	2.177E+03	3.8931	3.2678	.63	2.44
91	2.270E+03	3.8742	3.2695	.63	2.43
92	2.367E+03	3.8553	3.2711	.63	2.41
93	2.470E+03	3.8363	3.2727	.62	2.40
94	2.578E+03	3.8174	3.2744	.62	2.39
95	2.691E+03	3.7984	3.2760	.62	2.38
96	2.809E+03	3.7795	3.2776	.61	2.37
97	2.934E+03	3.7605	3.2792	.61	2.35
98	3.064E+03	3.7416	3.2809	.61	2.34
99	3.202E+03	3.7227	3.2825	.61	2.33

MODEL	TYPE	LOG(L/L SUN)	LOG(TEMP)	RAQUE 52	2 ADJUST
100	3.346E+00	3.7337	3.2242	.60	2.32
101	3.407E+00	3.6848	3.2359	.60	2.31
102	3.456E+00	3.6659	3.2374	.60	2.30
103	3.522E+00	3.6460	3.2391	.59	2.29
104	3.593E+00	3.6270	3.2407	.59	2.27
105	4.181E+00	3.6000	3.2423	.59	2.26
106	4.374E+00	3.5900	3.2440	.59	2.25
107	4.576E+00	3.5711	3.2456	.58	2.24
108	4.780E+00	3.5521	3.2472	.58	2.23
109	5.012E+00	3.5332	3.2489	.58	2.22
110	5.246E+00	3.5142	3.2505	.57	2.21
111	5.492E+00	3.4953	3.2521	.57	2.19
112	5.751E+00	3.4764	3.2538	.57	2.18
113	6.022E+00	3.4574	3.2554	.56	2.17
114	6.306E+00	3.4385	3.2570	.56	2.16
115	6.605E+00	3.4195	3.2587	.56	2.15
116	6.910E+00	3.4006	3.2603	.56	2.14
117	7.248E+00	3.3816	3.2619	.55	2.13
118	7.594E+00	3.3627	3.2636	.55	2.12
119	7.957E+00	3.3437	3.2652	.55	2.11
120	8.338E+00	3.3248	3.2668	.55	2.10
121	8.738E+00	3.3058	3.2685	.54	2.09
122	9.158E+00	3.2869	3.2701	.54	2.08
123	9.599E+00	3.2679	3.2717	.54	2.07
124	1.006E+10	3.2490	3.2734	.53	2.06
125	1.055E+10	3.2300	3.2750	.53	2.05
126	1.106E+10	3.2111	3.2766	.53	2.04
127	1.159E+10	3.1921	3.2783	.53	2.03
128	1.216E+10	3.1731	3.2799	.52	2.02
129	1.275E+10	3.1542	3.2815	.52	2.00
130	1.337E+10	3.1352	3.2832	.52	1.99
131	1.402E+10	3.1163	3.2848	.52	1.98
132	1.470E+10	3.0973	3.2864	.51	1.98
133	1.542E+10	3.0784	3.2881	.51	1.97
134	1.617E+10	3.0594	3.2897	.51	1.96
135	1.696E+10	3.0405	3.2913	.51	1.95
136	1.779E+10	3.0215	3.2930	.50	1.94
137	1.866E+10	3.0026	3.2946	.50	1.93
138	1.958E+10	2.9836	3.2963	.50	1.92
139	2.054E+10	2.9646	3.2979	.50	1.91
140	2.155E+10	2.9457	3.2995	.49	1.90
141	2.260E+10	2.9267	3.3012	.49	1.89
142	2.372E+10	2.9077	3.3028	.49	1.88
143	2.490E+10	2.8888	3.3044	.49	1.87
144	2.611E+10	2.8698	3.3061	.49	1.86
145	2.739E+10	2.8509	3.3077	.48	1.85
146	2.874E+10	2.8319	3.3093	.48	1.84
147	3.016E+10	2.8130	3.3110	.48	1.83
148	3.165E+10	2.7940	3.3126	.47	1.82
149	3.321E+10	2.7750	3.3142	.47	1.81

MODEL	TIME	LOG(T/ALSM)	LOG(T/SEB)	DOUGL 52	2/25/51
150	3.485E+10	2.7561	3.3450	.47	1.80
151	3.658E+10	2.7371	3.3675	.47	1.80
152	3.839E+10	2.7191	3.3601	.46	1.72
153	4.028E+10	2.6992	3.3708	.46	1.72
154	4.228E+10	2.6802	3.3724	.46	1.77
155	4.437E+10	2.6612	3.3740	.46	1.76
156	4.657E+10	2.6423	3.3757	.46	1.75
157	4.887E+10	2.6232	3.3773	.45	1.74
158	5.120E+10	2.6043	3.3780	.45	1.73
159	5.384E+10	2.5853	3.3806	.45	1.73
160	5.651E+10	2.5664	3.3822	.45	1.72
161	5.931E+10	2.5474	3.3830	.44	1.71
162	6.225E+10	2.5284	3.3855	.44	1.70
163	6.534E+10	2.5094	3.3871	.44	1.62
164	6.850E+10	2.4905	3.3893	.44	1.62
165	7.100E+10	2.4715	3.3904	.44	1.67
166	7.557E+10	2.4525	3.3920	.43	1.67
167	7.932E+10	2.4335	3.3937	.42	1.66
168	8.326E+10	2.4145	3.3953	.42	1.65
169	8.740E+10	2.3955	3.3960	.42	1.64
170	9.175E+10	2.3766	3.3986	.42	1.62
171	9.631E+10	2.3576	3.4002	.42	1.62
172	1.011E+11	2.3386	3.4010	.42	1.62
173	1.061E+11	2.3196	3.4035	.42	1.61
174	1.114E+11	2.3006	3.4051	.42	1.60
175	1.170E+11	2.2816	3.4068	.41	1.52
176	1.228E+11	2.2626	3.4084	.41	1.53
177	1.280E+11	2.2436	3.4100	.41	1.52
178	1.353E+11	2.2246	3.4117	.41	1.57
179	1.420E+11	2.2056	3.4133	.41	1.56
180	1.491E+11	2.1866	3.4150	.40	1.55
181	1.565E+11	2.1676	3.4166	.40	1.54
182	1.643E+11	2.1486	3.4182	.40	1.54
183	1.725E+11	2.1296	3.4199	.40	1.52
184	1.811E+11	2.1106	3.4215	.40	1.52
185	1.902E+11	2.0916	3.4232	.39	1.51
186	1.996E+11	2.0725	3.4248	.39	1.51
187	2.096E+11	2.0535	3.4264	.39	1.50
188	2.201E+11	2.0345	3.4281	.39	1.49
189	2.310E+11	2.0155	3.4297	.39	1.48
190	2.426E+11	1.9965	3.4313	.38	1.49
191	2.547E+11	1.9774	3.4330	.38	1.47
192	2.674E+11	1.9584	3.4346	.38	1.46
193	2.807E+11	1.9394	3.4363	.38	1.45
194	2.947E+11	1.9203	3.4379	.38	1.45
195	3.094E+11	1.9013	3.4396	.37	1.44
196	3.249E+11	1.8822	3.4412	.37	1.43
197	3.411E+11	1.8632	3.4428	.37	1.42
198	3.581E+11	1.8442	3.4445	.37	1.42
199	3.760E+11	1.8251	3.4461	.37	1.41

WQDEF	TIME	LOG(1/ALSM)	LOG(TFEE)	DOQDEF	SD	2/2/88
200	3.048E+11	1.8061	3.4478	.37		1.43
201	4.145E+11	1.7970	3.4404	.36		1.40
202	4.353E+11	1.7670	3.4510	.36		1.39
203	4.570E+11	1.7490	3.4527	.36		1.38
204	4.708E+11	1.7208	3.4543	.36		1.37
205	5.030E+11	1.7107	3.4560	.36		1.37
206	5.200E+11	1.6917	3.4576	.35		1.36
207	5.555E+11	1.6726	3.4592	.35		1.36
208	5.833E+11	1.6535	3.4600	.35		1.35
209	6.124E+11	1.6344	3.4626	.35		1.34
210	6.431E+11	1.6153	3.4642	.35		1.34
211	6.753E+11	1.5962	3.4650	.35		1.33
212	7.001E+11	1.5771	3.4675	.34		1.32
213	7.445E+11	1.5580	3.4691	.34		1.32
214	7.818E+11	1.5390	3.4702	.34		1.31
215	8.210E+11	1.5197	3.4724	.34		1.30
216	8.621E+11	1.5006	3.4741	.34		1.30
217	9.053E+11	1.4815	3.4757	.34		1.29
218	9.506E+11	1.4624	3.4774	.33		1.28
219	9.983E+11	1.4432	3.4790	.33		1.28
220	1.048E+12	1.4241	3.4807	.33		1.27
221	1.101E+12	1.4040	3.4823	.33		1.26
222	1.156E+12	1.3857	3.4840	.33		1.26
223	1.214E+12	1.3666	3.4856	.33		1.25
224	1.275E+12	1.3474	3.4873	.32		1.25
225	1.330E+12	1.3282	3.4890	.32		1.24
226	1.406E+12	1.3090	3.4906	.32		1.23
227	1.477E+12	1.2909	3.4923	.32		1.22
228	1.551E+12	1.2706	3.4939	.32		1.22
229	1.629E+12	1.2514	3.4956	.32		1.21
230	1.711E+12	1.2322	3.4972	.31		1.21
231	1.797E+12	1.2130	3.4989	.31		1.20
232	1.887E+12	1.1937	3.5006	.31		1.20
233	1.982E+12	1.1745	3.5022	.31		1.19
234	2.081E+12	1.1552	3.5039	.31		1.18
235	2.186E+12	1.1359	3.5055	.31		1.18
236	2.296E+12	1.1167	3.5072	.30		1.17
237	2.412E+12	1.0974	3.5089	.30		1.17
238	2.533E+12	1.0781	3.5105	.30		1.16
239	2.661E+12	1.0588	3.5122	.30		1.16
240	2.795E+12	1.0394	3.5139	.30		1.15
241	2.936E+12	1.0201	3.5155	.30		1.14
242	3.084E+12	1.0008	3.5172	.30		1.14
243	3.239E+12	.9816	3.5189	.29		1.13
244	3.403E+12	.9623	3.5205	.29		1.12
245	3.575E+12	.9429	3.5222	.29		1.12
246	3.755E+12	.9233	3.5239	.29		1.12
247	3.945E+12	.9039	3.5255	.29		1.11
248	4.144E+12	.8846	3.5272	.29		1.10
249	1.176E+13	.8652	3.5289	.29		1.10

TABLE C-21

PRE-MAIN SEQUENCE BINARY MODEL FOR W URSAE MINORIS

PRIMARY MASS = 2.68 $M_{\odot}$

PERIOD = 1.703 DAYS

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE	ED	2/3 SUN
1	2.587E+11	1.2249	3.7535	.02		4.01
2	5.173E+11	1.2270	3.7551	.02		4.12
3	7.760E+11	1.2292	3.7569	.03		4.17
4	1.035E+12	1.2314	3.7584	.03		4.15
5	1.293E+12	1.2326	3.7600	.07		4.12
6	1.552E+12	1.2358	3.7617	.07		4.12
7	1.811E+12	1.2370	3.7633	.06		4.02
8	2.069E+12	1.2401	3.7649	.06		4.06
9	2.328E+12	1.2423	3.7666	.05		4.04
10	2.587E+12	1.2445	3.7682	.05		4.02
11	2.845E+12	1.2467	3.7699	.04		4.00
12	3.104E+12	1.2489	3.7715	.04		3.92
13	3.363E+12	1.2510	3.7731	.03		3.96
14	3.621E+12	1.2532	3.7747	.03		3.94
15	3.880E+12	1.2554	3.7764	.02		3.92
16	4.139E+12	1.2576	3.7780	.02		3.92
17	4.397E+12	1.2598	3.7797	.01		3.92
18	4.656E+12	1.2620	3.7813	.01		3.86
19	4.915E+12	1.2641	3.7829	.00		3.85
20	5.173E+12	1.2662	3.7846	.00		3.82
21	5.432E+12	1.2685	3.7862	.00		3.81
22	5.691E+12	1.2707	3.7878	.00		3.72
23	5.949E+12	1.2729	3.7895	.00		3.77
24	6.208E+12	1.2751	3.7911	.02		3.75
25	6.467E+12	1.2773	3.7927	.04		3.72
26	6.725E+12	1.2795	3.7944	.07		3.71
27	6.984E+12	1.2816	3.7960	.07		3.60
28	7.243E+12	1.2838	3.7976	.06		3.62
29	7.501E+12	1.2860	3.7993	.06		3.66
30	7.760E+12	1.2882	3.8009	.06		3.64
31	8.019E+12	1.2904	3.8025	.05		3.62
32	8.277E+12	1.2926	3.8042	.05		3.60
33	8.536E+12	1.2948	3.8058	.04		3.59
34	8.795E+12	1.2970	3.8075	.04		3.57
35	9.053E+12	1.2991	3.8091	.03		3.55
36	9.312E+12	1.3013	3.8107	.03		3.53
37	9.571E+12	1.3035	3.8124	.03		3.51
38	9.830E+12	1.3057	3.8140	.02		3.50
39	1.009E+13	1.3079	3.8156	.02		3.48
40	1.035E+13	1.3101	3.8173	.01		3.46
41	1.061E+13	1.3123	3.8189	.01		3.44
42	1.086E+13	1.3145	3.8205	.01		3.42
43	1.112E+13	1.3167	3.8222	.00		3.41
44	1.138E+13	1.3189	3.8239	.00		3.39
45	1.164E+13	1.3211	3.8255	.00		3.32
46	1.190E+13	1.3232	3.8271	.00		3.26
47	1.216E+13	1.3255	3.8287	.00		3.24
48	1.242E+13	1.3277	3.8304	.00		3.22
49	1.267E+13	1.3299	3.8320	.00		3.21

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	POURCED	Z/D SUN
50	1.223E+13	1.3321	3.2324	.77	2.22
51	1.310E+13	1.3242	3.2353	.77	2.22
52	1.345E+13	1.3364	3.2360	.77	2.26
53	1.371E+13	1.3386	3.2386	.76	2.24
54	1.207E+13	1.3408	3.2402	.76	2.23
55	1.423E+13	1.3430	3.2418	.76	2.21
56	1.440E+13	1.3452	3.2435	.75	2.12
57	1.474E+13	1.3475	3.2451	.75	2.12
58	1.500E+13	1.3497	3.2467	.74	2.16
59	1.524E+13	1.3510	3.2484	.74	2.15
60	1.552E+13	1.3541	3.2500	.74	2.12
61	1.578E+13	1.3563	3.2517	.73	2.12
62	1.604E+13	1.3585	3.2533	.73	2.10
63	1.630E+13	1.3607	3.2549	.72	2.08
64	1.655E+13	1.3620	3.2566	.72	2.07
65	1.681E+13	1.3651	3.2582	.72	2.05
66	1.707E+13	1.3673	3.2599	.71	2.04
67	1.732E+13	1.3695	3.2615	.71	2.02
68	1.750E+13	1.3717	3.2632	.71	2.01
69	1.785E+13	1.3730	3.2648	.70	2.00
70	1.811E+13	1.3762	3.2664	.70	2.02
71	1.837E+13	1.3784	3.2681	.70	2.06
72	1.862E+13	1.3806	3.2697	.69	2.05
73	1.888E+13	1.3828	3.2714	.69	2.02
74	1.914E+13	1.3850	3.2730	.69	2.02
75	1.940E+13	1.3872	3.2746	.68	2.00
76	1.966E+13	1.3895	3.2762	.68	2.00
77	1.992E+13	1.3917	3.2779	.68	2.02
78	2.018E+13	1.3930	3.2796	.67	2.06
79	2.043E+13	1.3961	3.2812	.67	2.05
80	2.069E+13	1.3984	3.2829	.67	2.02
81	2.095E+13	1.4006	3.2845	.66	2.02
82	2.121E+13	1.4028	3.2862	.66	2.00
83	2.147E+13	1.4050	3.2878	.66	2.70
84	2.173E+13	1.4072	3.2895	.65	2.72
85	2.199E+13	1.4095	3.2911	.65	2.76
86	2.224E+13	1.4117	3.2927	.65	2.75
87	2.250E+13	1.4140	3.2944	.64	2.73
88	2.276E+13	1.4162	3.2960	.64	2.72
89	2.302E+13	1.4185	3.2977	.64	2.71
90	2.328E+13	1.4207	3.2993	.63	2.62
91	2.354E+13	1.4229	3.2910	.63	2.69
92	2.380E+13	1.4252	3.2926	.63	2.67
93	2.406E+13	1.4274	3.2943	.62	2.65
94	2.431E+13	1.4297	3.2959	.62	2.61
95	2.457E+13	1.4319	3.2976	.62	2.62
96	2.483E+13	1.4342	3.2992	.61	2.61
97	2.509E+13	1.4365	3.2100	.61	2.60
98	2.535E+13	1.4387	3.2126	.61	2.52
99	2.561E+13	1.4410	3.2142	.61	2.52

MODEL	TIME	LOG(L/L _{SUN})	LOG(TEMP)	DOORS	2/2SUN
100	2.597E+12	1.4433	3.2150	.60	2.56
101	2.612E+12	1.4455	3.2175	.60	2.56
102	2.638E+12	1.4479	3.2199	.60	2.56
103	2.664E+12	1.4501	3.2202	.59	2.52
104	2.690E+12	1.4523	3.2225	.59	2.51
105	2.716E+12	1.4546	3.2241	.59	2.50
106	2.742E+12	1.4569	3.2252	.59	2.49
107	2.768E+12	1.4592	3.2275	.58	2.47
108	2.793E+12	1.4615	3.2291	.58	2.46
109	2.819E+12	1.4638	3.2302	.58	2.45
110	2.845E+12	1.4661	3.2325	.57	2.44
111	2.871E+12	1.4684	3.2341	.57	2.42
112	2.897E+12	1.4707	3.2358	.57	2.41
113	2.923E+12	1.4730	3.2374	.56	2.40
114	2.949E+12	1.4753	3.2391	.56	2.39
115	2.975E+12	1.4776	3.2402	.56	2.39
116	3.000E+12	1.4799	3.2424	.56	2.36
117	3.026E+12	1.4823	3.2441	.55	2.35
118	3.052E+12	1.4846	3.2459	.55	2.34
119	3.078E+12	1.4869	3.2475	.55	2.32
120	3.104E+12	1.4893	3.2491	.55	2.32
121	3.130E+12	1.4916	3.2508	.54	2.31
122	3.156E+12	1.4939	3.2525	.54	2.29
123	3.181E+12	1.4963	3.2542	.54	2.28
124	3.207E+12	1.4987	3.2559	.53	2.27
125	3.233E+12	1.5010	3.2575	.53	2.26
126	3.259E+12	1.5034	3.2592	.53	2.25
127	3.285E+12	1.5058	3.2609	.53	2.24
128	3.311E+12	1.5081	3.2626	.52	2.22
129	3.337E+12	1.5105	3.2642	.52	2.22
130	3.362E+12	1.5129	3.2659	.52	2.20
131	3.388E+12	1.5153	3.2676	.52	2.19
132	3.414E+12	1.5177	3.2693	.51	2.18
133	3.440E+12	1.5201	3.2710	.51	2.17
134	3.466E+12	1.5226	3.2727	.51	2.16
135	3.492E+12	1.5250	3.2744	.51	2.15
136	3.518E+12	1.5274	3.2761	.50	2.14
137	3.544E+12	1.5299	3.2778	.50	2.13
138	3.569E+12	1.5323	3.2795	.50	2.12
139	3.595E+12	1.5348	3.2812	.50	2.11
140	3.621E+12	1.5372	3.2829	.49	2.10
141	3.647E+12	1.5397	3.2846	.49	2.09
142	3.673E+12	1.5422	3.2863	.49	2.08
143	3.699E+12	1.5447	3.2880	.49	2.07
144	3.725E+12	1.5472	3.2897	.49	2.06
145	3.750E+12	1.5497	3.2915	.48	2.04
146	3.776E+12	1.5522	3.2932	.48	2.03
147	3.802E+12	1.5548	3.2949	.48	2.02
148	3.828E+12	1.5573	3.2966	.47	2.01
149	3.854E+12	1.5599	3.2984	.47	2.00

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE 50	D/PSH
150	3.280E+13	1.5624	4.0001	.47	1.00
151	3.204E+13	1.5650	4.0018	.47	1.00
152	3.231E+13	1.5676	4.0036	.46	1.07
153	3.257E+13	1.5702	4.0053	.46	1.06
154	3.283E+13	1.5728	4.0070	.46	1.05
155	4.009E+13	1.5754	4.0088	.46	1.04
156	4.035E+13	1.5781	4.0105	.46	1.04
157	4.061E+13	1.5807	4.0123	.45	1.03
158	4.087E+13	1.5834	4.0140	.45	1.02
159	4.112E+13	1.5861	4.0158	.45	1.01
160	4.138E+13	1.5888	4.0176	.45	1.00
161	4.164E+13	1.5915	4.0193	.44	1.00
162	4.190E+13	1.5942	4.0211	.44	1.00
163	4.216E+13	1.5970	4.0229	.44	1.07
164	4.242E+13	1.5997	4.0246	.44	1.06
165	4.268E+13	1.6025	4.0264	.44	1.05
166	4.294E+13	1.6053	4.0282	.43	1.04
167	4.319E+13	1.6081	4.0300	.43	1.03
168	4.345E+13	1.6109	4.0318	.43	1.02
169	4.371E+13	1.6138	4.0336	.43	1.01
170	4.397E+13	1.6166	4.0354	.42	1.00
171	4.423E+13	1.6195	4.0372	.42	1.00
172	4.449E+13	1.6224	4.0390	.42	1.00
173	4.475E+13	1.6254	4.0409	.42	1.00
174	4.500E+13	1.6283	4.0427	.42	1.00
175	4.526E+13	1.6312	4.0445	.41	1.00
176	4.552E+13	1.6343	4.0463	.41	1.00
177	4.578E+13	1.6372	4.0482	.41	1.00
178	4.604E+13	1.6404	4.0500	.41	1.00
179	4.630E+13	1.6434	4.0519	.41	1.00
180	4.656E+13	1.6465	4.0538	.40	1.00
181	4.681E+13	1.6496	4.0556	.40	1.00
182	4.707E+13	1.6528	4.0575	.40	1.00
183	4.733E+13	1.6560	4.0594	.40	1.00
184	4.759E+13	1.6592	4.0613	.40	1.00
185	4.785E+13	1.6624	4.0632	.39	1.00
186	4.811E+13	1.6657	4.0651	.39	1.00
187	4.837E+13	1.6690	4.0670	.39	1.00
188	4.862E+13	1.6723	4.0690	.39	1.00
189	4.888E+13	1.6756	4.0709	.39	1.00
190	4.914E+13	1.6790	4.0728	.39	1.00
191	4.940E+13	1.6824	4.0747	.39	1.00
192	4.966E+13	1.6859	4.0767	.39	1.00
193	4.992E+13	1.6894	4.0786	.39	1.00
194	5.018E+13	1.6929	4.0806	.39	1.00
195	5.043E+13	1.6965	4.0826	.37	1.00
196	5.069E+13	1.7001	4.0846	.37	1.00
197	5.095E+13	1.7037	4.0866	.37	1.00
198	5.121E+13	1.7074	4.0886	.37	1.00
199	5.147E+13	1.7111	4.0906	.37	1.00

NOBEL	TIME	LOG(L/LSUN)	LOG(TEMP)	BOUNCE	2XDSUN
200	5.1725E+13	1.7142	4.0026	.27	1.55
201	5.1905E+13	1.7187	4.0046	.26	1.54
202	5.2055E+13	1.7225	4.0067	.26	1.54
203	5.2505E+13	1.7264	4.0089	.26	1.53
204	5.2765E+13	1.7303	4.1008	.26	1.52
205	5.3025E+13	1.7343	4.1020	.26	1.51
206	5.3285E+13	1.7383	4.1050	.25	1.51
207	5.3545E+13	1.7424	4.1071	.25	1.50
208	5.3805E+13	1.7465	4.1092	.25	1.49
209	5.4065E+13	1.7507	4.1114	.25	1.48
210	5.4315E+13	1.7549	4.1135	.25	1.48
211	5.4575E+13	1.7592	4.1157	.25	1.47
212	5.4835E+13	1.7635	4.1179	.24	1.46
213	5.5095E+13	1.7679	4.1200	.24	1.45
214	5.5355E+13	1.7724	4.1222	.24	1.45
215	5.5615E+13	1.7769	4.1244	.24	1.44
216	5.5875E+13	1.7814	4.1267	.24	1.43
217	5.6125E+13	1.7860	4.1289	.24	1.42
218	5.6385E+13	1.7907	4.1312	.23	1.42
219	5.6645E+13	1.7955	4.1334	.23	1.41
220	5.6905E+13	1.8003	4.1357	.23	1.40
221	5.7165E+13	1.8051	4.1380	.23	1.40
222	5.7425E+13	1.8101	4.1404	.23	1.39
223	5.7685E+13	1.8150	4.1427	.23	1.38
224	5.7935E+13	1.8201	4.1450	.22	1.38
225	5.8195E+13	1.8252	4.1474	.22	1.37
226	5.8455E+13	1.8304	4.1498	.22	1.36
227	5.8715E+13	1.8357	4.1522	.22	1.36
228	5.8975E+13	1.8411	4.1546	.22	1.35
229	5.9235E+13	1.8465	4.1571	.22	1.34
230	5.9495E+13	1.8520	4.1595	.21	1.34
231	5.9745E+13	1.8575	4.1620	.21	1.33
232	6.0005E+13	1.8632	4.1645	.21	1.32
233	6.0265E+13	1.8689	4.1670	.21	1.32
234	6.0525E+13	1.8747	4.1696	.21	1.31
235	6.0785E+13	1.8805	4.1721	.21	1.30
236	6.1045E+13	1.8865	4.1747	.20	1.30
237	6.1305E+13	1.8925	4.1773	.20	1.29
238	6.1555E+13	1.8986	4.1799	.20	1.28
239	6.1815E+13	1.9048	4.1826	.20	1.28
240	6.2075E+13	1.9111	4.1852	.20	1.27
241	6.2335E+13	1.9175	4.1879	.20	1.26
242	6.2595E+13	1.9240	4.1906	.20	1.26
243	6.2855E+13	1.9305	4.1933	.20	1.25
244	6.3115E+13	1.9371	4.1961	.20	1.24
245	6.3365E+13	1.9439	4.1989	.20	1.24
246	6.3625E+13	1.9507	4.2016	.20	1.23
247	6.3885E+13	1.9576	4.2044	.20	1.23
248	.0005E+00	1.9645	4.2073	.00	.00
249	.0005E+00	.0000	.0000	.00	.00

TABLE C-22

PRE-MAIN-SEQUENCE BINARY MODEL FOR W URSAE MINORIS

SECONDARY MASS - $1.19 M_{\odot}$

PERIOD = 1.701 DAYS

MODEL	TIME	LOG(L/L _{SUN})	LOG(T _{EFF})	LOG(L ₁)	LOG(L ₂)
1	8.812E+08	3.3744	3.3660	.02	2.32
2	1.324E+09	3.3554	3.3686	.02	2.32
3	1.300E+09	3.3365	3.3702	.02	2.35
4	2.309E+09	3.3175	3.3718	.02	2.35
5	2.832E+09	3.2986	3.3735	.07	2.33
6	3.381E+09	3.2796	3.3751	.07	2.32
7	3.950E+09	3.2607	3.3767	.06	2.31
8	4.565E+09	3.2418	3.3784	.06	2.72
9	5.201E+09	3.2228	3.3800	.05	2.72
10	5.860E+09	3.2039	3.3816	.05	2.76
11	6.570E+09	3.1849	3.3833	.04	2.75
12	7.306E+09	3.1660	3.3849	.04	2.74
13	8.070E+09	3.1470	3.3865	.03	2.72
14	8.900E+09	3.1281	3.3882	.02	2.71
15	9.742E+09	3.1092	3.3898	.02	2.70
16	1.064E+10	3.0902	3.3914	.02	2.68
17	1.157E+10	3.0712	3.3931	.01	2.67
18	1.256E+10	3.0523	3.3947	.01	2.66
19	1.350E+10	3.0334	3.3963	.00	2.64
20	1.448E+10	3.0145	3.3980	.00	2.62
21	1.582E+10	2.9955	3.3996	.00	2.62
22	1.702E+10	2.9766	3.4012	.02	2.60
23	1.828E+10	2.9576	3.4029	.00	2.50
24	1.950E+10	2.9387	3.4045	.03	2.52
25	2.098E+10	2.9197	3.4061	.02	2.56
26	2.243E+10	2.9008	3.4078	.07	2.55
27	2.396E+10	2.8818	3.4094	.07	2.54
28	2.556E+10	2.8629	3.4110	.06	2.53
29	2.725E+10	2.8440	3.4127	.06	2.51
30	2.901E+10	2.8250	3.4143	.06	2.50
31	3.087E+10	2.8061	3.4159	.05	2.49
32	3.281E+10	2.7871	3.4176	.05	2.48
33	3.486E+10	2.7682	3.4192	.04	2.46
34	3.700E+10	2.7492	3.4208	.04	2.45
35	3.926E+10	2.7303	3.4225	.03	2.44
36	4.162E+10	2.7113	3.4241	.02	2.43
37	4.410E+10	2.6924	3.4257	.03	2.41
38	4.671E+10	2.6735	3.4274	.02	2.40
39	4.945E+10	2.6545	3.4290	.02	2.39
40	5.232E+10	2.6356	3.4306	.01	2.38
41	5.534E+10	2.6166	3.4323	.01	2.37
42	5.850E+10	2.5977	3.4339	.01	2.35
43	6.183E+10	2.5787	3.4356	.00	2.34
44	6.532E+10	2.5599	3.4372	.00	2.32
45	6.898E+10	2.5409	3.4389	.02	2.32
46	7.283E+10	2.5219	3.4404	.02	2.31
47	7.687E+10	2.5029	3.4421	.02	2.30
48	8.111E+10	2.4840	3.4437	.02	2.29
49	8.556E+10	2.4650	3.4453	.02	2.27

MODEL	TIME	LOG(L / SUM)	LOG(TT/ST)	DOCFR FR	DOCSUM
50	2.223E+10	2.4461	3.4470	.77	2.26
51	2.513E+10	2.4271	3.4496	.77	2.25
52	1.003E+11	2.4022	3.4502	.77	2.24
53	1.057E+11	2.3902	3.4512	.76	2.23
54	1.114E+11	2.3703	3.4535	.76	2.22
55	1.173E+11	2.3513	3.4551	.76	2.21
56	1.236E+11	2.3324	3.4562	.75	2.19
57	1.302E+11	2.3134	3.4584	.75	2.18
58	1.370E+11	2.2945	3.4600	.74	2.17
59	1.443E+11	2.2755	3.4617	.74	2.16
60	1.510E+11	2.2566	3.4633	.74	2.15
61	1.580E+11	2.2376	3.4649	.73	2.14
62	1.682E+11	2.2187	3.4666	.72	2.13
63	1.770E+11	2.1997	3.4682	.73	2.12
64	1.863E+11	2.1808	3.4699	.72	2.11
65	1.960E+11	2.1618	3.4715	.72	2.10
66	2.061E+11	2.1429	3.4731	.71	2.09
67	2.168E+11	2.1239	3.4747	.71	2.08
68	2.280E+11	2.1050	3.4764	.71	2.07
69	2.398E+11	2.0860	3.4780	.70	2.06
70	2.522E+11	2.0671	3.4796	.70	2.05
71	2.652E+11	2.0481	3.4813	.70	2.04
72	2.788E+11	2.0291	3.4829	.69	2.03
73	2.931E+11	2.0102	3.4845	.69	2.02
74	3.081E+11	1.9912	3.4862	.69	2.01
75	3.239E+11	1.9723	3.4879	.68	2.00
76	3.404E+11	1.9533	3.4894	.68	1.99
77	3.578E+11	1.9344	3.4911	.68	1.98
78	3.761E+11	1.9154	3.4927	.67	1.97
79	3.952E+11	1.8964	3.4943	.67	1.96
80	4.153E+11	1.8775	3.4960	.67	1.95
81	4.365E+11	1.8585	3.4976	.66	1.94
82	4.586E+11	1.8396	3.4993	.66	1.93
83	4.819E+11	1.8206	3.5009	.66	1.92
84	5.063E+11	1.8016	3.5025	.65	1.91
85	5.320E+11	1.7827	3.5042	.65	1.90
86	5.589E+11	1.7637	3.5058	.65	1.89
87	5.872E+11	1.7447	3.5074	.64	1.88
88	6.169E+11	1.7258	3.5091	.64	1.87
89	6.481E+11	1.7068	3.5107	.64	1.86
90	6.808E+11	1.6878	3.5123	.63	1.85
91	7.151E+11	1.6689	3.5140	.63	1.84
92	7.512E+11	1.6499	3.5156	.63	1.83
93	7.891E+11	1.6309	3.5172	.62	1.82
94	8.289E+11	1.6120	3.5189	.62	1.81
95	8.706E+11	1.5930	3.5205	.62	1.80
96	9.144E+11	1.5740	3.5221	.61	1.79
97	9.604E+11	1.5550	3.5238	.61	1.78
98	1.008E+12	1.5361	3.5254	.61	1.77
99	1.050E+12	1.5171	3.5271	.61	1.77

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE	SP	DAYS IN
100	1.113E+12	1.4281	3.5287	.60		1.76
101	1.160E+12	1.4701	3.5202	.60		1.75
102	1.227E+12	1.4601	3.5220	.60		1.74
103	1.280E+12	1.4412	3.5236	.60		1.73
104	1.354E+12	1.4222	3.5252	.60		1.73
105	1.422E+12	1.4032	3.5360	.60		1.72
106	1.403E+12	1.3842	3.5285	.63		1.71
107	1.568E+12	1.3652	3.5401	.63		1.70
108	1.647E+12	1.3462	3.5419	.63		1.69
109	1.720E+12	1.3272	3.5434	.63		1.68
110	1.816E+12	1.3082	3.5451	.67		1.67
111	1.907E+12	1.2892	3.5467	.67		1.67
112	2.002E+12	1.2703	3.5483	.67		1.66
113	2.103E+12	1.2512	3.5500	.66		1.65
114	2.208E+12	1.2323	3.5516	.66		1.64
115	2.319E+12	1.2132	3.5532	.66		1.63
116	2.435E+12	1.1943	3.5549	.66		1.62
117	2.557E+12	1.1752	3.5565	.66		1.62
118	2.685E+12	1.1563	3.5582	.66		1.61
119	2.812E+12	1.1372	3.5599	.66		1.60
120	2.961E+12	1.1182	3.5614	.66		1.59
121	3.109E+12	1.0992	3.5631	.64		1.59
122	3.264E+12	1.0802	3.5647	.64		1.58
123	3.428E+12	1.0612	3.5664	.64		1.57
124	3.592E+12	1.0422	3.5680	.63		1.56
125	3.780E+12	1.0232	3.5696	.63		1.55
126	3.960E+12	1.0041	3.5713	.63		1.55
127	4.168E+12	.9851	3.5729	.63		1.54
128	4.376E+12	.9661	3.5746	.62		1.53
129	4.595E+12	.9471	3.5762	.62		1.52
130	4.825E+12	.9280	3.5779	.62		1.51
131	5.067E+12	.9090	3.5795	.62		1.51
132	5.320E+12	.8900	3.5811	.61		1.50
133	5.587E+12	.8709	3.5828	.61		1.49
134	5.866E+12	.8518	3.5844	.61		1.48
135	6.160E+12	.8328	3.5860	.61		1.48
136	6.469E+12	.8138	3.5877	.60		1.47
137	6.792E+12	.7947	3.5893	.60		1.46
138	7.122E+12	.7756	3.5910	.60		1.45
139	7.480E+12	.7566	3.5926	.60		1.45
140	7.864E+12	.7375	3.5943	.49		1.44
141	8.258E+12	.7184	3.5959	.49		1.43
142	9.672E+12	.6994	3.5975	.49		1.43
143	9.104E+12	.6803	3.5992	.49		1.42
144	9.563E+12	.6612	3.6008	.48		1.41
145	1.004E+13	.6421	3.6025	.48		1.40
146	1.054E+13	.6230	3.6041	.48		1.40
147	1.107E+13	.6039	3.6059	.48		1.39
148	1.163E+13	.5848	3.6074	.47		1.38
149	1.221E+13	.5657	3.6091	.47		1.38

MODEL	TIME	LOG(L/L SUN)	LOG(TEMP)	DOSE	DOSE
150	1.2825+12	.5466	3.6107	.47	1.27
151	1.3465+12	.5275	3.6124	.47	1.26
152	1.4145+12	.5084	3.6140	.46	1.26
153	1.4855+12	.4892	3.6157	.46	1.25
154	1.5595+12	.4701	3.6172	.46	1.24
155	1.6375+12	.4510	3.6190	.46	1.24
156	1.7205+12	.4319	3.6206	.46	1.23
157	1.8065+12	.4127	3.6222	.45	1.22
158	1.8965+12	.3935	3.6230	.45	1.22
159	1.9925+12	.3743	3.6256	.45	1.21
160	2.0925+12	.3552	3.6272	.45	1.20
161	2.1975+12	.3360	3.6280	.44	1.20
162	2.3075+12	.3168	3.6305	.44	1.20
163	2.4235+12	.2976	3.6322	.44	1.23
164	2.5445+12	.2784	3.6332	.44	1.22
165	2.6725+12	.2592	3.6355	.44	1.27
166	2.8065+12	.2400	3.6371	.43	1.26
167	2.9485+12	.2208	3.6382	.43	1.26
168	3.0965+12	.2015	3.6405	.43	1.25
169	3.2515+12	.1823	3.6421	.42	1.25
170	3.4155+12	.1630	3.6433	.42	1.24
171	3.5875+12	.1438	3.6454	.42	1.23
172	3.7675+12	.1245	3.6471	.42	1.23
173	3.9575+12	.1052	3.6489	.42	1.22
174	4.2735+12	-.2669	3.6504	.42	1.21
175	4.5925+12	-.2645	3.6521	.41	1.21
176	4.9185+12	-.2622	3.6539	.41	1.20
177	5.2325+12	-.2599	3.6554	.41	1.20
178	5.5505+12	-.2576	3.6571	.41	1.19
179	5.8805+12	-.2552	3.6588	.41	1.18
180	6.2005+12	-.2530	3.6604	.40	1.18
181	6.5215+12	-.2506	3.6621	.40	1.17
182	6.8415+12	-.2483	3.6639	.40	1.17
183	7.1615+12	-.2460	3.6654	.40	1.16
184	7.4825+12	-.2436	3.6671	.40	1.16
185	7.8025+12	-.2412	3.6689	.39	1.15
186	8.1235+12	-.2389	3.6705	.39	1.14
187	8.4435+12	-.2366	3.6721	.39	1.14
188	8.7645+12	-.2342	3.6738	.39	1.13
189	9.0845+12	-.2318	3.6755	.39	1.13
190	9.4055+12	-.2295	3.6772	.38	1.12
191	9.7255+12	-.2271	3.6789	.38	1.12
192	1.0055+13	-.2247	3.6805	.37	1.11
193	1.0375+13	-.2223	3.6822	.36	1.10
194	1.0695+13	-.2199	3.6839	.36	1.10
195	1.1015+13	-.2175	3.6856	.37	1.09
196	1.1335+13	-.2151	3.6873	.37	1.09
197	1.1655+13	-.2127	3.6890	.37	1.09
198	1.1975+13	-.2102	3.6907	.37	1.08
199	1.2295+13	-.2078	3.6924	.37	1.07

MODEL	TIME	LOG(1/15 IN)	LOG(TEMP)	POORER TO	W/2000
200	1.261E+14	-.2054	3.6041	.27	1.27
201	1.203E+14	-.2020	3.6052	.26	1.26
202	1.325E+14	-.2005	3.6075	.26	1.26
203	1.357E+14	-.1990	3.6092	.26	1.25
204	1.380E+14	-.1956	3.7022	.26	1.25
205	1.421E+14	-.1931	3.7026	.26	1.24
206	1.453E+14	-.1906	3.7042	.25	1.23
207	1.485E+14	-.1881	3.7060	.25	1.23
208	1.517E+14	-.1856	3.7077	.25	1.22
209	1.549E+14	-.1831	3.7095	.25	1.22
210	1.581E+14	-.1805	3.7112	.25	1.21
211	1.613E+14	-.1780	3.7120	.25	1.21
212	1.645E+14	-.1754	3.7146	.24	1.20
213	1.677E+14	-.1729	3.7164	.24	1.20
214	1.709E+14	-.1703	3.7181	.24	.22
215	1.742E+14	-.1677	3.7199	.24	.22
216	1.774E+14	-.1651	3.7216	.24	.22
217	1.806E+14	-.1625	3.7232	.24	.22
218	1.838E+14	-.1599	3.7251	.22	.27
219	1.870E+14	-.1573	3.7268	.22	.27
220	1.902E+14	-.1546	3.7286	.23	.26
221	1.934E+14	-.1519	3.7303	.22	.26
222	1.966E+14	-.1493	3.7321	.23	.25
223	1.998E+14	-.1466	3.7339	.23	.25
224	2.030E+14	-.1439	3.7356	.22	.25
225	2.062E+14	-.1411	3.7374	.22	.24
226	2.094E+14	-.1384	3.7391	.22	.24
227	2.126E+14	-.1357	3.7409	.22	.22
228	2.158E+14	-.1329	3.7427	.22	.23
229	2.190E+14	-.1301	3.7445	.22	.22
230	2.222E+14	-.1273	3.7463	.21	.22
231	2.254E+14	-.1245	3.7481	.21	.21
232	2.286E+14	-.1216	3.7499	.21	.21
233	2.318E+14	-.1189	3.7517	.21	.20
234	2.350E+14	-.1159	3.7535	.21	.20
235	2.382E+14	-.1130	3.7553	.21	.20
236	2.414E+14	-.1101	3.7571	.20	.20
237	2.446E+14	-.1071	3.7589	.20	.20
238	2.478E+14	-.1041	3.7609	.20	.22
239	2.511E+14	-.1012	3.7626	.20	.23
240	2.543E+14	-.0981	3.7644	.20	.27
241	2.575E+14	-.0951	3.7662	.20	.27
242	2.607E+14	-.0920	3.7681	.20	.26
243	2.639E+14	-.0890	3.7700	.20	.26
244	2.671E+14	-.0859	3.7719	.20	.26
245	2.703E+14	-.0827	3.7737	.20	.25
246	2.735E+14	-.0796	3.7756	.20	.25
247	2.767E+14	-.0764	3.7775	.20	.24
248	.000E+00	.0000	.0000	.00	.22
249	.000E+00	.0000	.0000	.00	.22

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BIOGRAPHICAL SKETCH

Jon Kenneth West was born on January 12, 1947, in Gosport, Indiana. He was graduated from North Central High School in Indianapolis, Indiana, in 1965. In 1969 he was graduated from Ottawa University, Ottawa, Kansas, and was awarded a graduate assistantship in Physics at Kansas State University. He was graduated with a Master of Science degree in 1971 and took employment with General Electric Company on their two-year Manufacturing Management Program. As an M. M. P. graduate, he was transferred to G. E. Battery Business Department in Gainesville, Florida. He was a production supervisor. In 1974, he was promoted into Manufacturing Engineering. His responsibilities included the design and implementation of major pieces of electro chemical process equipment. Concurrently, he began studying Astrophysics at the University of Florida. He was promoted to a Senior Project Engineer and assigned to an environmental task force in 1978. He was responsible for the design, construction, start up and budget of three major subsystems of an environmental process waste water treatment system. Some of the design calculations required modeling techniques developed for this dissertation. He was married to Donna Lee Minich in 1969. They have three lovely children, Andrea Michelle (4), Denise Marie (2) and Daniel Jay (1).

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Kwan-Yu Chen

Kwan-Yu Chen, Chairman
Professor of Astronomy

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Frank Bradshaw Wood

Frank Bradshaw Wood
Professor of Astronomy

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T. D. Carr

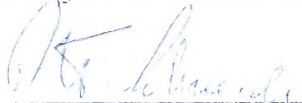
T. D. Carr
Professor of Physics and Astronomy

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



John P. Oliver
Associate Professor of Astronomy

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



R. T. Schneider
Professor of Nuclear Engineering
Sciences

This dissertation was submitted to the Graduate Faculty of the Department of Physics and Astronomy in the College of Liberal Arts and Sciences and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

June, 1979

Dean, Graduate School

UNIVERSITY OF FLORIDA



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